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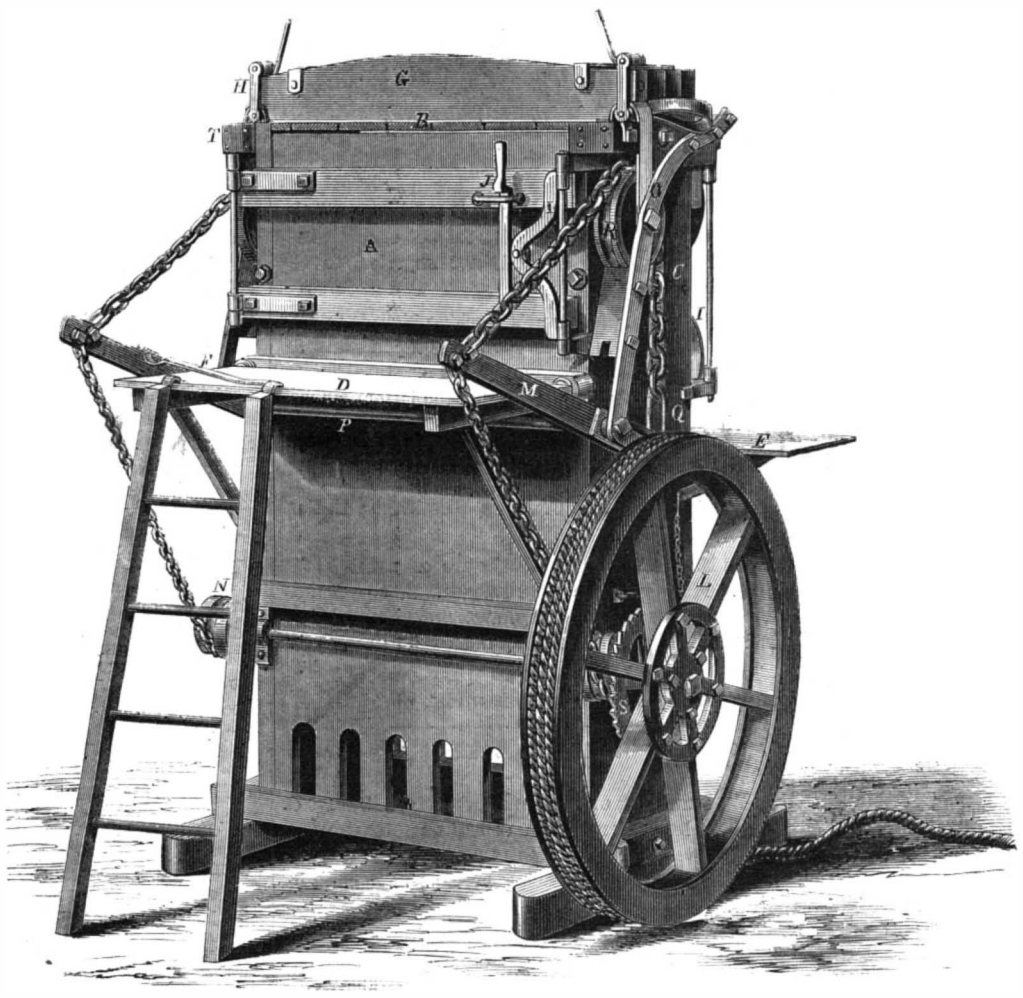
Improved Baling Press.

The advantages which result from compressing bulky substances in a small compass are very great, for by this operation a great deal of space is economized, and more of the material may be stored within a limited area; for purposes of preparing hay, cotton or like substances for transportation, or even for the convenience of farmers or warehouse men, machines which accomplish this object are indispensable.

The press herewith illustrated is—it is claimed by the inventor—a most convenient and powerful one. The operating machinery is all on the outside, leaving the interior of the press-box unobstructed; the press is small and compact in comparison with the size of the bale it will make, as it is ordinarily but eight feet high, can be loaded on any wagon by two men. and drawn by a single team of horses or oxen. It is also conveniently arranged as regards the door-fastenings, the attaching of strings to the bales, etc.; these features, together with the immense strain imparted by the levers, render this press a most desirable one. The following description will enable our readers to understand its construction and mode of operation:—



PRICE'S BALING PRESS.

The machine has three doors—one on top and one on each side; one of them may be seen at A, and another at B, this is the opening where the material to be pressed is delivered to the press-box, C, which is merely a strong square structure of wood firmly bolted together. There is also a follower outside the box, which consists of a stout wooden or metallic partition on which the substance to be pressed rests; this follower is carried up by the chains and levers seen at the side in a manner which will be shown hereafter. There are also platforms, D and E, where the material is delivered and discharged, on the platform, D, there is a spring catch, F, which holds the door above in a favorable position for loading the press. On top of the upper door, B, there are two strong beams, G, which hold the top door down, and take the strain of the machinery below; these beams are themselves held down by the eccentric rollers, H, worked by the handles attached to them. The door, A, is kept closed by the curved bar, I, and the lever, J; when this bar is turned in the manner shown in the engraving, and the lever moved over it, there is a projection on the latter which keeps the bar in its place; there is a similar fastening on the opposite side.

The power to press the bale is given by the wheel, L, the levers, M, and the spirally-grooved wheels, N: these latter are on the same shaft as the wheel, L. The levers are not attached to the brace, O, but work on a shaft, P, that passes under the front platform. The follower has a plate outside of the press-box to which the chain, Q, is fastened. This chain runs over the pulley, R, is taken by the ends of the levers, M, and from them proceeds to the spiral-grooved wheels, N. It is easy to see that when power is applied to the large wheel by attaching a horse or an ox to the rope, and turning it by driving the animal, the chains will draw down the lever and elevate the follower, thus pressing the substance inside. In the engraving the levers are shown in the act of pressing, for when the follower is down they stand vertically; it will be observed also that one of the chains is attached nearer to the center of the lever than the other; this prevents the lever from getting on the center, makes it start easier, and is a great advantage in other respects. The leverage also constantly increases as the rope is drawn out, for it will be seen that when the lever is vertical only a portion of its length is actually available, this is all that is required when the substance to be pressed is loose; as the mass becomes more compact the mechanical efficiency of the levers is increased. When the pressed bale is to be removed the pawl in the ratchet wheel, S, is withdrawn; the levers then fly up and are received by the check pieces, T, which are faced with leather, so as to break the force of the shock. The inside of the press-box, at the top where the greatest compression takes place, is not square, but the sides incline towards each other; by this arrangement a square bale is produced, the inventor stating that it is not possible to make a square bale in a square box as the upper part is not as perfectly compressed as the lower; with a box constructed in the manner described the result is as set forth.

It is stated that these presses are rapidly superseding all others on the Pacific coast, on account of the advantages mentioned heretofore. A patent on this invention was granted, through the Scientific American Patent Agency on Sept. 1st, 1863, to Jacob Price, Jr., of Petaluma, Cal.; for further information address the inventor at that place.

Colt's Armory.

The loss of machinery by the burning of Colt's Armory is estimated at $800,000. There were six miles of steam pipe in the building, and the scene presented by the ruins as they remain resembles the ancient cities unearthed by modern explorations; there are nothing except crumbling fragments where a splendid building so recently existed. The question is now asked—who fired the Armory? That the supposition of an emissary coming from the rebels to fire the building is not preposterous, is shown by the fact that not long ago a workman did come there with the piteous story that he was a deserter from the rebels, and he was employed. But when the fire broke out—it was during the only half-hour in the twenty-four when a watchman was not present; there being an interval of half an hour in the morning between the going-away of the night watchman for that floor and the one below it, and the coming of the day watchman. It could not have been fired in the night, because then the watchmen were all about, and no one could have got into the building. It was kindled in the wing connecting the two main buildings, so that it was likely to take both and destroy the rifle as well as the pistol shops. It started where the patterns and much choice dry wood were stored, which would readily kindle. It is a great mystery how it could have caught fire itself, and no one but a rebel sympathizer could have desired its destruction.

THE Stark Mills, Manchester, N. H., are running about one-third of their machinery, consuming 100 bales of cotton per week.

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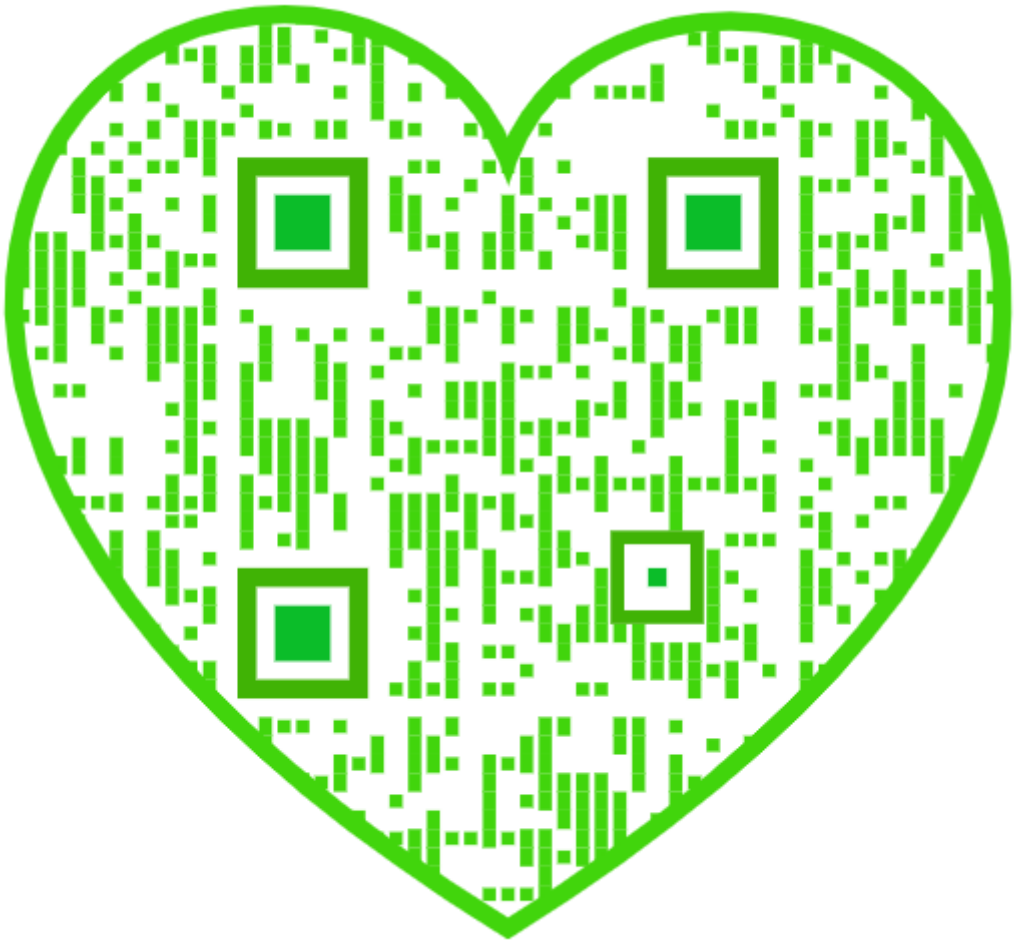

Manufacturing Items.

THE *Commercial Bulletin* of Boston (a most excellent weekly journal by the way) says that the manufacture of flax into fabrics of cloth and twine has been steadily advancing at Lockport, N. Y. The company engaged in the business have employed 30 hands in a large building where, to make the white fabric from the raw material, about five days are required. Twine is made in less than two days. In the third story, Race, Mathews & Co. are about putting in new machinery for the more extensive manufacture of twine and rope. The second story is filled with such machinery now, which is running every day. The company have been very fortunate in securing the services of Joseph Taylor as superintendent, a gentleman recently from England, whose life has been devoted to this business. Under his efficient management the enterprise will gather new life. They have on hand a large supply of flax, but are still buying all they can get at $15 per tun, and the farmers are preparing for a much more extensive crop for the coming year.

THE following stave and barrel works are in operation in the Saginaw Valley, Mich.:—O. A. Ballou & Co., Kaw-kaw-lin, own stave and heading works which cut 20,000 staves daily; cooper shop in connection, where 100 barrels are put up per day. C. & E. Ten Eyck, East Saginaw, general machinery; cut in 1863, 2,500,000 staves, with requisite heading; capacity, 3,500,000; cooper shop in connection. Fisher & Lee, East Saginaw, general machinery and saws for cutting tight barrel staves; cut in 1863, 400,000 staves and 20,000 sets heading; capacity, 4,000,000 staves, 200,000 sets heading. Curtis & King, Salina, own stave and heading works; capacity, 3,000,000 pieces staves and heading. Empire Barrel Company, Carrolton, made in 1863, 16,000 barrels, 500,000 staves, and 30,000 sets heading; they have general machinery and stave-sawing machines for tight work; capacity for cutting 3,000,000 heads per annum.

THE New Bedford Copper Company's mill was in operation 275 days in 1863, during which 2,113½ gross tuns of metals were melted, and about 2,500,000 lbs. of yellow metal sheathing, heavy yellow metal plates for Government vessels, and bolts, were turned out—a daily product of 9,091½ pounds, and an increase of nearly 33 per cent. on the daily production of the preceding year. The cost of manufacturing was about the same as in 1862, the improved facilities and increased skill being countervailed by the enhanced cost of material. Five per cent. of the metals melted are lost—passing off through the chimneys. Most, if not all, this waste will be prevented by a new apparatus which arrests the flying particles of the molten metal.

THERE have been manufactured at the Armory in Springfield, during the last month, 25,700 muskets—a larger number than ever before fabricated in a single month. The last two weeks 6,000 were turned out each week, averaging 1,000 each day. The largest number ever manufactured before in one week was 5,040. When the last month's work is completed, there will be in store at the Armory over 200,000 guns, of which 40,000 are packed ready for shipment. The number of guns to be made the present month will probably equal the last month.

THE Haydenville Brass Works have been established some fifteen years, and now employ 150 hands in manufacturing brass work for plumbers, engine builders, and machinists. They have a high reputation for perfection of finish and manufacture. The business of plumbers' supplies has increased so much of late that their Boston agents, Messrs. Dalton & Ingersoll, 17 Union street, have given up a large hardware trade and are now engaged entirely in these specialities.

MILWAUKEE already manufactures more leather than any city in the West. The Wisconsin Leather Company alone last year produced more than half a million dollars' worth of leather. There are now building near the canal, in the Sixth Ward, two large tanneries—one for Mr. Zohrlaut and the other for Mr. Neumann, both men of large experience in the business.

THE flannel mill of John Townsend, of Milton Mills, Rochester, N. H., is now in full blast, and turns out about 13,000 yards of flannel per week.

T. B. PHELPS has completed a "Pea Factory," at Detroit. The building is of brick, 40 by 80 feet, and is devoted to a two-fold use, viz: the "splitting" and grinding of peas, the raw material being obtained from Canada, and the kiln-drying of grain preparatory to its consumption for manufacturing purposes. The machinery is propelled by a neat engine of 15 horse-power, built at the foundry of J. B. Wayne & Co., and the whole affair is the handiwork of Detroit artisans. Among the most noteworthy items of the machinery is an ingeniously contrived screening apparatus for dividing the peas into two sizes, preparatory to splitting them. This was arranged and put up by John Babillion. The mill has capacity for turning out a barrel of peas ready for market every five minutes. The kiln-drying apparatus is designed chiefly for cargoes of damaged grain, and shippers and underwriters who are so unfortunate as to sustain damage to cargoes, will find it a great convenience in being thus enabled to obtain a market.

FLAX is getting into extensive use in Wisconsin for manufacturing purposes. At Milwaukee there are exhibited specimens of flax white as snow, and also colored with the most brilliant hue; calico made of fifty per cent. of flax; cotton flannel, one-half flax; felted cloths, and a variety of other manufactures of which flax is a component part. As handsome an article of broadcloth is manufactured from this cottonized flax as could be desired.

THE number of cigars made by one firm in Detroit, Mich., in 1862, was 1,500,000. The tobacco is all imported from New York, and is the growth either of Havana or Connecticut, mostly of the latter. Cigars are all made by hand. Attempts have been made to bring in the aid of machinery in their manufacture, but they have proved futile.

THE Nova Scotia grindstones are now largely superseded by those obtained in Ohio, which for all the different varieties of grit, either for wet or dry grinding, are pronounced equal, if not superior, to the best English stone.

THE Amoskeag Company's Machine Shop is fully in operation, employing over 400 hands upon arms for the Government and steam fire-engines (turning out on an average about two a week of the latter), as well as doing other miscellaneous work.

THE Ames Plow Company, with $400,000 capital, has been organized in Boston, to manufacture agricultural implements. O. Ames, President; E. Tasker, Treasurer.

THE Manchester Print Works are as usual in full blast. Many valuable improvements have recently been made by this company, and probably no establishment in the whole country is superior to it.

THE Taunton Locomotive Company are building an extensive improvement to their works.

FARMERS' CLUB.

At the meeting of the Farmers' Club on the 1st of March, a long discussion was had on miscellaneous subjects, valuable for the most part to farmer's only. We select two items as being perhaps of general interest.

A communication was received from a man in Illinois, giving an account of some experiments made by him to ascertain the quantity of pork which could be produced from a bushel of corn, fed in different states. As young pigs require food other than corn, he took for experiments swine more than four months old. He says that, with hogs in clean comfortable pens, supplied with plenty of dry straw—

50	lbs. of	corn,	whole and raw,	will make	10	lbs. of	pork
50	"	do.	ground	"	15	"	"
50	"	do	ground and fermented	"	17	"	"
50	"	do.	cooked and fermented	"	21	"	"

The subject of the application of magnesian limestone being introduced, Mr. Thompson remarked that while it was well known that magnesian soils are very poor for most crops, he had observed that they were very favorable for melons. He had planted water-melons on rich, strong land; and the fruit was hardly larger than oranges and almost tasteless; while at the same time he had seen water-melons growing on almost barren magnesian soils, and the melons were very delicious, and some of them weighed forty pounds. Mr. Thompson asked an explanation of this, but received no answer.

MISCELLANEOUS SUMMARY.

A GOOD INVESTMENT.—Within the memory of some of the older merchants of New York, Robert Lenox purchased a farm on the eastern side of the "Central Park" for the sum of $30,000. That property now belongs to his son, James Lenox, a resident of this city; and he has recently put it upon the market for sale. According to a map now before us, the old farm contains 404 city lots, each 25 feet by 100. At the rate which some of the property has recently been sold, its entire value cannot fall much short of $2,500,000. This may be regarded as a good investment.

THE "GREAT EASTERN."—The fate of the *Great Eastern* seems to trouble the English people greatly. A correspondent of the *Mechanic's Magazine* suggests that the side wheels and their engines be removed altogether and that new and simpler screw engines, working steam expansively, and capable of accomplishing a higher rate of piston speed than the old ones, be introduced; equal at least to a total of 10,000 horse-power. The correspondent thinks that with this arrangement the increased cargo-room and augmented speed of the ship would make her not only popular but profitable.

A MAMMOTH HOTEL.—The Lindell Hotel, St. Louis, is the largest hotel in the United States. It is seven stories high, exclusive of basement. Its height from sidewalk to cornice is 112 feet. Beside marble flooring and other flagging, 300,000 feet of flooring boards have been laid, requiring 300,000 feet of carpet to cover them. Thirty-two miles of bell-wire are used, and three water-tanks, or reservoirs, into which 30,000 gallons of water are taken up and distributed to all parts of the house, rest upon the roof. The whole property will have cost nearly a million and a half of dollars.

MECHANICS EXCLUDED.—At one time the rich merchants and professional men of Philadelphia proposed to form themselves into a social circle, from which all mechanics were to be excluded. The papers were drawn up for this purpose and presented to Dr. Franklin for his signature. On examining its contents he remarked that he could not consent to write his name, inasmuch as by excluding mechanics from their circle, they had excluded the Almighty, who was the greatest mechanic of the universe.

SILVER DISCOVERED IN MICHIGAN.—There is great excitement in Michigan over the discovery of silver near Lake Superior. Speculation has already commenced. Men who have taken lands at one dollar and twenty-five cents an acre, are selling out at advances of thousands of dollars upon the original cost of their tracts. One tract has been sold for six thousand dollars; the owner bought it a few weeks ago from Government for two hundred dollars. The specimens of ore contain liberal quantities of lead and silver.

ARTESIAN WELLS IN THE DESERT,—Modern science is literally making "the desert to blossom as the rose." In the great desert of Sahara in 1860, five artesian wells had been opened, around which vegetation thrives luxuriantly; thirty thousand palm trees and one thousand fruit trees were planted, and two thriving villages established. At the depth of a little over five hundred feet, an underground river or lake was struck, and from two wells live fish have been thrown up, showing that there is a large body of water underneath.

VAN DUSEN'S whip factory, in Westfield, turns out 300 dozen whips per week.

ONE of the verdicts against New York city, for riot and damages, is the sum of $55,000.

THE ATLANTIC MONTHLY. Published by Ticknor & Fields, Boston, Mass.

The March number of this excellent magazine is as welcome as ever. The contents embrace continuations of several articles which were commenced in the February number, such as the "Convulsionists of St. Medard," "Relation of Art to Nature," which is becoming tedious; and the "House and Home" papers of Mrs. Stowe, of these no one could ever tire, so pleasingly are they written. A tribute to the Quaker poet, Whittier, and also one to the memory of Thackeray, by a friend of his, render this number an exceedingly valuable one. For sale by all booksellers.

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Designs for Textile Fabrics.

It is by no means creditable to American art that it has done so little to render our textile industries independent of European designs. We have cotton mills producing goods worth $100,000,000 per annum, and woolen factories manufacturing $100,000,000 of woolen fabrics; and yet for the printed designs in the former and the woven in the latter we are almost exclusively dependent on patterns imported from England and France. It is true that our printers of calicoes and delaines have their employed designers who produce patterns creditable to their taste; but with slight exceptions they are accustomed to follow the lead of European fashion, and their productions are mere accommodations of foreign styles, not always altered for the better. In the manufacture of fancy woolen goods we are still more dependent on foreign invention. There is scarcely a manufacturer in the country who makes any pretentions to originality. The principle mills have their agents abroad who forward specimens of all new goods, which are either copied, or produced in a modified and too often less desirable form. One result of this abject dependence on European taste and invention is that our fabricants are always a season behind European fabrics. The samples of English or French products do not arrive here in time to be reproduced for the current season, they consequently are copied here some months later, when the foreign products are here to compete with them, having probably been exported from Europe as old styles at a reduced price. Large amounts of foreign fancy goods are sent to this country after having been refused by European buyers. They are bought as unseasonable goods at a reduction of from ten to twenty per cent from the original price, and come upon this market just as we are producing the same class of styles. The reduced price at which they have been purchased has enabled the importer to compete much more closely with the domestic manufacturer than he otherwise could. Had we the designing talent that would enable us to originate our fashions and produce our own styles, instead of affording foreign fabricants an opportunity of throwing their old goods upon our markets to compete with our new productions, we should compel them, if they would produce for us at all, to follow our own inventions, which course they would find to a considerable extent impracticable; for in order to produce, for instance, fancy cassimeres following styles of our own, they would have to wait until our own styles appeared, when it would be too late for them to manufacture and send them across the Atlantic for the season's market. Thus foreign fancy-goods would be practically excluded from our market.

Manufacturers may be assured that a far more effective protection than high tariffs may be established by their paying liberally for the best designing talent; so as to enable them to produce distinctive American styles and be the authors of their own fashions. This is not to be achieved at once, nor without a concerted and vigorous effort to develop the latent art of the country. Our painters and sculptors are acquiring a world-wide fame, proving that the genius of art inheres in the intellect of our people. It is for our manufacturers to found and foster institutions calculated to bring out the taste of our young men, and to ally art with industry. A school of design founded in this city, placed under the guidance of the best artists in the country, and offering its advantages at a cheap rate, would in five years develop industrial art to an extent that would go far towards rendering us comparatively independent of foreign taste and designs, and place our manufacturers upon a footing, in respect of art, commensurate with the immense capital invested in their industries.—*U. S. Economist.*

The Great Labor of Simple Work.

That a man's labor must not be estimated by the character of his work is evident from the following paragraph cut from an English paper:

"The horse-nail maker's hammer averages 3lb., and the average amount of blows required to make a nail is from 36 to 38, so that in making one nail he must lift 112 lbs.; consequently in making a thousand, which quantity is considered a fair day's work, he has lifted the enormous weight of 50 tuns, and that with the right hand only; and we must take into account the gravity of the iron, which is near allied to that of steel, and the reduction that must take place in the rod to reduce it to a proper size required to another size fit to drive into a horse's foot. For instance, a workman takes 15 lbs. of rods to make a thousand of say 12 lb. counter-sunk horse-nails (which is the weight allowed), the size will be 11-32, or a little less than 3-8. He must reduce that in every nail to 1-12th of an inch. For example, the 15lbs. of rods will measure (before commencing work) 35 feet to 36 feet, as the case may be, and when the work is finished it will measure, in the form of nails, fully 208 feet 4 inches. So that a workman in doing an ordinary day's work has drawn the iron about 173 feet so that horse-nail making is all work. He must work 8 hours per day, and draw the iron, as above stated, 22 feet or thereabouts, every hour, or over 4¼ inches every minute. It will be seen the force required from the body, shoulder, and arm, in order to accomplish such labor, is very great; hence the bent shoulder, the curved arm, the contracted muscles, &c., which are almost invariably seen in the horse-nail maker of fifty, who has followed it from his youth."

These men get about $1 per day and they ask a shilling more, which it is doubtful if they will get.

The Colorado Gold Mines.

The *Commercial Bulletin* says:—"It is only within a few years that much has been known about Colorado, and now principally from its gold product, which has run up to millions annually, the product of the ensuing year being estimated at over twenty millions, and with the improvements now brought to bear upon the extraction of gold quartz the same amount of labor is increasing the yield three or four fold. The attention of New York and eastern capitalists has been attracted to the mines of Colorado, and heavy amounts have been invested in claims. About a million and a half has been invested since September last, and eight or ten new companies started, which if honestly managed, must pay largely.

"The Excelsior Company, which started in the spring of 1863, has made considerable headway, and owns a valuable property; at the rates paid for claims now it could be sold so as to net $10 or $15 a share; the management, however, think the results justify developing rather than selling; its market price now is about $7½ per share.

"The Colorado Gold Mining Company, of Boston, one of the most prominent and profitable of these companies, which is owned principally by New England capitalists, and which has a large amount of improved machinery in successful operation, is now running a large mill, the building of which, with its machinery, cost over one hundred thousand dollars, while the application of scientific invention is very largely increasing its yield of the precious metal."

A Broadside from the "Ironsides."

A correspondent of the London *Times*, writing from Richmond under date of Dec. 21st, thus discourses of naval armament:

"Again I feel tempted to raise a warning voice about the disparity of the armament on board of the English and American vessels. It is impossible for those who have been many months absent from England to be well informed as to the actual state of public opinion at the present moment upon this vital subject. But, judging from the officers of her majesty's navy who have at rare intervals brought vessels of war into Confederate ports, it appears still to be held, that the 68-pounder, or 8-inch smooth-bore, is England's best weapon of offense against iron-clad vessels. The experience gained at Charleston enables me confidently to affirm that as well might you pelt one of the Yankee monitors or the *Ironsides* with peas as to expect them to be in any way damaged by 8-inch shot. Another disagreeable question forces itself upon an Englishman's attention when he is cognizant of the terrible broadside thrown by the eight 11-inch guns of the *Ironsides*—one of the most formidable broadsides, in the opinion of the defenders of Charleston, which has ever been thrown by any vessel upon earth. Have we any ship in existence which could successfully resist such a broadside, and respond to it with anything like commensurate weight and vigor? I should be faithless to my duty if I did not mention that it is the universal opinion of all the English officers serving in the Confederate army, with whom I have conversed, that England is behind America in the weight and power of the guns sent by both nations to sea. It is still a matter of the greatest surprise to those who are cognizant of the endless experiments in guns and projectiles which are every day made by the Federal and Confederate States, that England has not thought it worth her while to attach to the armies of both nations such a commission as McClellan had in the Crimean war, with a view to their gaining such scientific information with regard to ordnance and projectiles as at this moment can be gained nowhere else on earth. It is my conviction that from both sections such commissioners would receive nothing but courteous and unreserved information upon all that is important for them to know. It is scarcely creditable to our Government that they should be blind to the opportunities for gaining information which this gigantic conflict affords, or that from old-world pride they should refuse to avail themselves of the experience to be derived from a continent destined henceforth and evermore to play no secondary part in the drama of the world."

A Charlatan Unmasked.

At a recent sitting of the members composing the Academy of Science the following resolution was passed:—

"*Resolved:* By the National Academy of Science, that, in the opinion of this Academy the volumes entitled 'Sailing Directions,' heretofore issued to navigators from the New Observatory, and the 'Wind and Current Charts,' which they are designed to illustrate and explain, embrace much which is unsound in philosophy and little that is practically useful, and that, therefore, these publications ought no longer to be issued in their present form."

This is all very well, but does it not strike these worthy savans that their protest is a little too late? After years of laudation from every one high and low, from Queen Victoria down to nobody, it is now first published to the world under, the sanction of scientific men, that the "Wind and Current Charts" are wrong. The Academy of Science will be called an old fogy institution with some truth if it never makes any predictions until they are verified by practice.

Loss of the "Bohemian."

The steamship *Bohemian*, of the Montreal Steam ship's Company's line, was lost at sea on the 22d ult. she struck a rock off Cape Elizabeth when going at half speed, knocked a hole in her bottom and went down in about an hour and a half. There were a large number of passengers on board, of whom twenty-six in the steerage are supposed to be lost. The night was perfectly clear. This company is very unfortunate, having lost no less than eight vessels since 1857, or over one a year. The *Bohemian* is said to be the twenty-fourth steamship lost at sea since the commencement of ocean navigation.

KNOWLTON'S SAW-MILL.—This excellent mill, which we illustrated on page 128 of the present volume, is meeting with great success. A number of the most prominent ship-building firms in Philadelphia are employing it; and one establishment—that of Messrs. Wm. Cramp & Sons—are sawing monitor beams with it; these beams are of white oak, 46 feet long, 14 inches deep, have 19 inches spring, and require to be beveled. Two men saw these beams with ease, at the rate of 62½ inches per minute. The mill is adapted to saw any kind of ship or boat timber without any alteration or adjustment whatever, and is also self-feeding; it will do all that the common saw will do, and has all the advantages we named. Parties interested are invited to call on the above-named builders and see the machine in operation.

THE NEW YORK "CENTRAL PARK."—More than 79,000 trees, shrubs, and herbaceous plants were planted in New York Central Park last year. The carriage-drive now completed is about eight miles in length; bridle-road five miles, and walks twenty miles. Over 4,000,000 persons visited the park in 1863, and in one day over 8,000 carriages entered the drives.

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SPHERICAL STEEL SHOT.

Mr. Bessemer has addressed the following letter to the Editor of the London *Times*:—

"Sir:—Under the head of 'Naval and Military Intelligence,' in your impression of the 14th, you have given a most interesting account of the experiments made with Bessemer steel spherical shots fired from a smooth-bored gun against 5½inch armor plate; their destructive effects, as compared with projectiles made of cast or wrought iron, entirely confirm the views I so long advocated in vain.

"It is now just three years since I obtained a patent for producing cast-steel spherical shot by a peculiar arrangement of the rolling-mill, by means of which spherical steel shots may be made with rapidity and correctness. I also exhibited a spherical steel cannon ball at the International Exhibition of 1862, for the purpose of giving further publicity to my views on this important question; but it is only after this lapse of time that a trial is made of them in England, although a delay of ten or twelve days, and an expenditure of £50, would have given us as full proof of their efficiency three years ago as we have to-day. Meanwhile, however, many hundred thousand pounds have been expended in building iron-plated ships, which these long neglected steel projectiles will riddle as easily as the cast-iron shot found its way through the wooden walls of our old men-of-war. It is marvellous how the advantages of using such a material for projectiles did not force itself on the attention of every practical artillerist, irrespective of any efforts on my part, for there is scarce a school-boy to be found who does not know that a snow-ball flung with great force is perfectly harmless, while a stone or other solid substance of equal weight would inflict a severe injury, simply because the snow-ball will fall to pieces on striking the object, while the stone would remain entire, and, consequently, administer the whole force with which it was thrown. Now, the way in which I cast-iron shot is broken and scattered in a shower of small fragments, on striking an armor-plate, bears a very strong analogy to the snow-ball in the case supposed. Indeed, it must be obvious to every mechanical mind that when a cast-iron shot is shivered to atoms against an armor plate, the force expanded in the disintegration of the solid spherical mass must be considerable; and it is equally clear that the force so expanded is not a new force created for a special purpose, but is part of the original force imparted to the shot, and that the amount of force so expanded on the shot must consequently be deducted from the available force to be expended on the armor plate, and hence the great inferiority of cast-iron as compared with steel shots, since the latter are not crushed by the force of the blow.

"It is not less remarkable that while our firm has manufactured at Sheffield some 150 pieces of Bessemer steel ordnance for foreign service, guns made of this material are still untried by our Government, although it is well known that the strength of this metal is double that of ordinary iron, while such is the facility of production that a solid steel gun block of 20 tuns in weight can be produced from fluid cast-iron in the short space of twenty minutes, the homogeneous mass being entire and free from weld or joint.

"My object, however, in addressing you, sir, is not so much to point out that which has not been done as to call attention to what I believe to be of vital importance for the future.

"Our armor-plate system has certainly received a severe shock, and it behoves us now to see how far it be possible to increase the resisting power of ships so far as to keep pace with the advances made by steel shot. Not longer ago than the 12th of December the fine ship *Minotaur* was launched from the dock of her builders at Blackwall. She was all that excellent workmanship and the best iron could make her, but still she was only iron.

"It has been stated that the hull of this vessel weighs 6,000 tuns, and her 4½in. armor 1,850 tuns, making a gross weight of 7,850 tuns. Now, had the hull of this vessel been built of a material possessing double the strength of ordinary iron, her weight might theoretically have been reduced to 3,000 tuns, but practically it would be wise to estimate more liberally, so that, while we admit a double strength of material, suppose we only reduce the weight by one-third, this would give 4,000 tuns of steel for the hull. Now, with this reduction in the weight of the hull, we may employ 9in. armor plates in lieu of the 4½in. armor plates now employed. This would give 2,700 tuns of armor and 4,000 tuns of hull, equal to a gross weight of 7,700 tuns, or 150 tuns less than the weight of the vessel as now constructed; and it must be borne in mind that the resistance offered by the armor plate is equal to the square of its thickness; hence a vessel constructed in the manner proposed would bear a blow of four times the force that the present structure is calculated to withstand.

"These weights given in round numbers are sufficiently accurate to explain the principle of construction which I propose and the important advantages which it holds out.

"It must not be supposed, however, that such a change would entail any of those difficulties which attended the change from wooden ships to iron ones, for what I propose is merely to employ a very strong and tough material in place of a much weaker one, so as to reduce the weight of the ship in nearly the same ratio. Such artisans as are now employed can work this metal with facility; the same machinery will cut and fashion it, and, indeed, all the present appliances of the iron shipbuilder will remain perfectly the same as at present. Already two ships are being built in foreign waters entirely of Bessemer steel, and the plates for a merchant vessel to be built in England have been ordered. It surely, therefore, would not be premature in our Government to investigate this subject most fully, for if a ship can, by the means I have pointed out, be enabled to carry 9-in. armor plates, we may rest assured that other nations will not be long without them.

"Thousands of Bessemer steel projectiles are now being made for Russia, and from undoubted sources I learn that other orders for steel shots have been given to the extent of £120,000 in value. Have we a single ship afloat that can keep out these simple round steel shot fired from a common smooth-bored gun, if ever directed against us? This is a grave question, and demands a speedy answer."

THE PRODUCTION OF CAST STEEL DIRECTLY FROM PIG IRON.

The *Colliery Guardian* (England) says:—"None of the foreign papers seem to have noticed the attempts of Cazanave to obtain cast steel directly from pig iron. The idea itself appears to be very ingenious, but of course the question is whether it is applicable in practice. The foundation of this new method is the influence of steam on a thin stream of pig iron. If we take an iron tube of a certain diameter with sides of the necessary strength, form a ring out of it, and fix on its circumference, towards the centre, three or more tubes, we have a tube ring with three or more radii. The radius is made fast to the tubular pipe; the ends of these tubes, which are open, do not quite reach to the centre of the ring, and have therefore, between the ends an empty space, in which the pig iron is allowed to flow in a stream of a certain strength. The stream led into the boiler from the tubular pipe flows out of the openings of the three tubes, and operates directly upon the pig iron. It is said that the oxygen of the steam oxidizes the carbon of the pig iron, the silicium, a portion of the sulphur, phosphorus, and other impurities in the pig iron; the hydrogen combines with the carbon, sulphur, phosphorus, arsenic, and other bodies, with which it forms combinations of hydrogen. The carbonized and purified metal falls into a crucible or other vessel placed immediately under the apparatus. The metal obtained contains impurities, and must, therefore, be smelted in crucibles in a blast or reverberatory furnace. This is the essential part of the process; the simplicity of the method and the cheapness of the product are evident.

"Now arises the questions:—Is it possible to obtain steel in large quantities by this method; will it be of the same quality as the small quantity obtained on trial; and, if it is possible, at what price can it be obtained?

"In answer to these questions, Cazanave asserts that by his method steel can be obtained in great quantities, not inferior to the best steel, and proportionately cheaper; for his best quality steel can be obtained for £18 per tun. This is difficult to believe, but the inventor affirms that it is so, and at the same time warrants the excellent quality of his steel. In the present method of obtaining steel, good iron must be used, which is cemented, and the cemented iron, that is the steel is smelted in crucibles. By Cazanave's method cementation of the iron is avoided, so that the cast steel may be obtained in unlimited quantities. If this new method turns out practicable, it will be possible to work up the whole daily production of a blast-furnace into steel. For this only the apparatus is required, which is not very costly, and which would be erected near the blast furnace and stream of pig iron. The stream would be divided into rays of the necessary strength, and each one directed into an apparatus. By Bessemer's process about ten tuns of steel are obtained per day at Sheffield; while by Cazanave's method sixty and seventy tuns per day could be obtained, and a blast-furnace is being erected at Charleroi which will produce about seventy-four tuns per day! The samples of steel furnished by this new process are reported to be very good. They were obtained from pig iron smelted with coke, but it is supposed that charcoal pig iron would give better results."

Economy is Wealth.

There is nothing which goes so far towards placing young people beyond the reach of poverty as proper economy in the management of household affairs. It matters not whether a man furnishes little or much for his family, if there is a continued leakage in his kitchen or parlor; it runs away, he knows not how, and that demon Waste cries "More!" like the horse-leech's daughter, until he that provided has no more to give. It is the husband's duty to bring into the house; and it is the duty of the wife to see that none goes wrongfully out of it. A man gets a wife to look after his affairs, and to assist him in his journey through life; to educate and prepare their children for a proper station in life, and not to dissipate his property. The husband's interest should be the wife's care, and her greatest ambition to carry her no further than his welfare or happiness, together with that of her children. This should be her sole aim, and the theater of her exploits in the bosom of her family, where she may do as much toward making a fortune as he can in the counting-room or the workshop. It is not the money earned that makes a man wealthy, it is what he saves from his earnings. Self-gratification in dress, or indulgence in appetite, or more company than his purse can well entertain, are equally pernicious.

Business Rules.—An Eastern paper gives the following seasonable and excellent rules for young men commencing business:—

The world estimates men by their success in life, and, by general consent, success is evidence of superiority.

Never under any circumstances assume a responsibility you can avoid consistently with your duty to yourself and others.

Base all your actions upon a principle of right; preserve your integrity of character, and in doing this never reckon on the cost.

Remember that self-interest is more likely to warp your judgment than all other circumstances combined; therefore, look well to your duty when your interest is concerned.

Never make money at the expense of your reputation.

Be neither lavish nor niggardly; of the two avoid the latter. A mean man is universally despised, but public favor is a stepping-stone to preferment; therefore, generous feelings should be cultivated.

Say but little—think much and do more.

Let your expenses be such as to leave a balance in your pocket. Ready money is a friend in need.

Keep clear of the law; for, even if you gain your case, you are generally a loser.

Avoid borrowing and lending.

Wine-drinking and smoking cigars are bad habits; they impair the mind and pocket, and lead to a waste of time.

Never relate your misfortune, and never grieve over what you cannot prevent.

Some hearts, like primroses, open most beautifully in the shadows of life.

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PERMANENT COMMISSION OF THE NAVY DEPARTMENT.

We have received the following official communication, which defines with accuracy the objects for which the Permanent Commission of the Navy Department is instituted; also the correct names and titles of its members:—

"On the 11th of February, 1863, the Navy Department organized a Permanent Commission, to which all subjects of a scientific character, concerning which the Government might require information, could be referred. The fundamental rules governing this Commission are as follows:—

"'1st. There shall be constituted a Permanent Commission, consisting for the present of Commodore (now Rear Admiral) Davis, Professor Henry and Professor Bache, to which shall be referred questions of science and art, upon which the Department may require information.

"'2d. This Commission shall have authority to call in associates to aid in their investigations and inquiries.

"'3d. The members and associates of the Commission shall receive no compensation for their services.'

"Such matters as are presented to the Department, and come within the scope of this precept, are referred to the Commission for examination and report. Since the Commission was first created, it has been enlarged by adding to it Brigadier-general Barnard and Mr. Saxton; subjects are occasionally referred to it from the War Department. The present members of the Commission are also members of the National Academy of Sciences; and the Commission itself would probably never have been created if the Academy had been in existence at that time, since they both have the same objects, and are designed to perform similar duties; it is not impossible that the former may at some future time be resolved into a Committee of the latter.

"The following is a correct list of the members of the Permanent Commission of the Navy Department:—

"C. H. Davis, Rear Admiral and Chief of Bureau of Navigation.

"Professor A. D. Bache, Superintendent of the U. S. Coast Survey.

"Professor Joseph Henry, Secretary of the Smithsonian Institution.

"Brigadier-general J. G. Barnard, Lieutenant-colonel of Engineers.

"Joseph Saxton, Assistant Superintendent of Weights and Measures.

"The head-quarters of the Commission are in Washington; and all communications should be addressed to Hon. Gideon Welles, Secretary of the Navy."

THE WAY BOILER SCALE IS DEPOSITED.

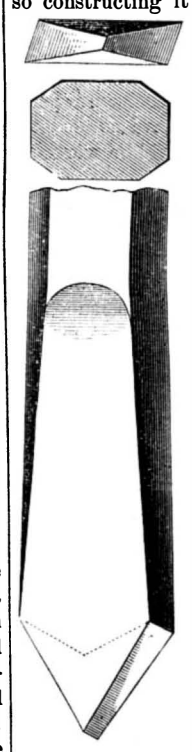
Carbonate of lime is scarcely soluble at all in pure hot water, is a little soluble in pure cold water, and quite soluble in water containing carbonic acid. Cold water, exposed for a long time to the atmosphere, always absorbs its own bulk of carbonic acid; and if, while thus mixed, it comes in contact with carbonate of lime, a portion of the stone will be dissolved. Hence the hard water of our springs and wells. If this water is placed in a boiler and heated, the first action of the heat is to drive off the carbonic acid; and this action, with the raising of the temperature, deprives the water of its power of holding the carbonate of lime in solution. The salt is consequently precipitated, and deposited as a hard scale in the boiler.

THE DRILL AND ITS OFFICE.

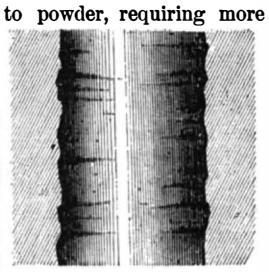
The office of the machinist's drill is to bore a true hole of a certain size in any metal. The conditions thus imposed upon the tool are sometimes fulfilled, but oftener not, and the reasons for this are to be found in a want of knowledge of the principle of a drill in those who made the tool, and sometimes from causes beyond the control of the mechanic; for good work cannot be made with bad materials. Three-sided holes, holes crooked in the length, holes small at the top and large at the bottom, and the reverse, ridgy holes, or those which appear to have been made with a coarse-threaded tap, oblong holes, nondescript holes, compounds of each and all the bad qualities previously mentioned, are made at times by poor workmen; and as there is no effect produced in the natural world without some cause, so also may the phenomena above mentioned be traced in mechanical operations to the omission of some important point in the construction of the drill which has been overlooked, and which is essential to its perfect operation.

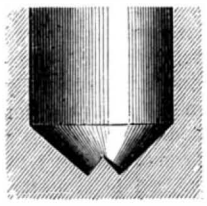
To drill a straight, true hole in metal of any kind, excepting lead or copper perhaps, is just as easy as to make a wretched "apology" which runs in every direction but the right one, and is remarkable for nothing but its unworkmanlike appearance. Neither does it take more time to make a good hole, but on the contrary a properly made drill works much quicker and better than one badly constructed. We have no means of ascertaining whether drills of the present form were used by the ancients, for in all the hieroglyphics disclosed by the efforts of Layard at Nineveh, the tombs of the kings of Egypt, and in more modern discoveries at Herculaneum and Pompeii, we have seen nothing at all corresponding to the modern drill. There must have been some means at the command of these people for working metals in the manner mentioned, but their precise form is unknown to us, and their nature undisclosed. We imagine, however, that to the American mechanic of the present day it matters little whether the eye socket of a bronze pagan idol was drilled in, or cast "cored out;" and whether the nostrils of the Sphinx, which sits forever in the sands of the desert gazing steadfastly into the future, were chipped, cast or rimmed with a rose bit is not pertinent to this article. The work of the past in a majority of cases lies hidden; let it be the aim and object of the artisans of to-day to strain every effort for improvement.

To drill a simple straight hole in any metal we have the ordinary drill as herewith illustrated. This seems a very simple tool to make, but it is surprising to see what apologies and substitutes for it are to be found in almost every machine shop; below is the drill as usually and improperly made. In the first figure it will be seen that the tool is a thin flat steel bar for a proportionate distance, which should be so far as it is proposed to drill in the work; that the cutting edges are at right angles with each other or square, that the section shows the drill to be slightly rounded on its edges, and lastly, that the extreme point is as small and fine as it can be made consistent with strength. This is a plain, flat drill without "lips." Now the object and design of so constructing it is this; the drill should be made flat and straight, so that the borings may escape freely and not be crushed or broken in trying to get out; neither carried round and round for several revolutions without rising to the surface, for in doing so they impede the newly formed chips below from rising out of the hole. The point should be made thin so that it will always work true to the center, and not tend to run out, or make a crooked hole; and the cutting edges are square for the reason that with this angle they cut equally from point to corner and no part works faster than the other.



Let us take the badly-made drill, as shown in the second figure, and see what its defects are; these can readily be noticed where they depart from the well formed drill. This drill is not exaggerated in the engraving, being far short in reality of some specimens of handiwork we have seen kicking about on machine-shop floors. The dotted lines of the point and cutting edges show the various angles it is ground to, and the section and point in straight lines will now be noticed. This is a very bad drill—it is almost unnecessary to say that; it is stubbed and blunt, and could not drill an inch with decent feed without getting so hot as to draw the temper. The section is octagon, which is the worst possible form, because the chips catch at the angles and, not being able to get out, are ground to powder, requiring more power to turn the drill than Fig. 1; the edges are sloped directly from the cutting edge to the back of the drill and the point is thick and square. With such a drill as this a hole like this one, at the left, would be made, and for these reasons: the thick point with its quick angles cuts unevenly; first the point bores down, and then the labor comes on the edges, and the drill-point works loose, making a cone center in the hole like this diagram; the consequence is that the hole is untrue. The sharp edges sloping so quickly toward the back are also a disadvantage, because they afford no support to the cutting edges, which go astray in consequence.





(To be continued.)

Destruction of a United States Steamer by a Torpedo.

The sloop-of-war, *Housatonic*, one of the new vessels, was recently destroyed while on the blockade off the Southern coast. The circumstances of the disaster are these:—

"About 8:45 P. M., of the 17th ult., the officer of the deck, Acting Master J. K. Crosby, discovered something in the water, about 100 yards from the vessel, moving toward the ship. It had the appearance of a plank moving on the water, and came directly toward the ship. The time when it was first seen till it was close alongside was about two minutes. The torpedo struck the *Housatonic* forward of the mizzen-mast, on the starboard side, in a line with the magazine. The after-pivot gun being pivoted to port, they were unable to bring a gun to bear upon the torpedo. About one minute after she was close alongside the explosion took place; the *Housatonic's* sinking stern first keeling to port as she sunk. Most of the crew clung to the rigging, and a boat was despatched to the *Canandaigua*, which vessel gallantly came to their assistance and all were rescued but the following named officers and men: Ensign E. C. Hazeltine, Captain's Clerk C. O. Muzzy, Quartermaster John Williams, landsman Theodore Parker, second-class fireman Jno. Walsh, who are missing and supposed to be drowned."

The rapidity with which this torpedo approached the vessel would seem to indicate that it was propelled by some machinery. Vessels lying at anchor, on blockade duty, should be protected by rafts or booms projecting from the side, having lines rove through the ends all around the ship. In this way those incendiary machines would be prevented from doing much mischief. The arrangement could be made very simple and yet effective.

Delay in raising the Monitor "Aquila."

Our California exchanges are in tribulation over the delay in raising the sunken monitor; one correspondent writes as follows:—"The delay in raising the monitor by some one of the feasible plans before the public, because it cannot be determined which is the best, may subject the city to the fate recorded by the poet of an ancient worthy, to wit:

The great Bomfogus, who of old
Wore his legs bare, and died of cold.

Because he could not decide whether to put the right or left leg first into his breeches, and therefore went breeches-less, and met with the catastrophe recorded of him. The lady Bomfogus urged him by all feminine entreaties to put one leg or the other into his inexpressibles, no matter which. "But how can I," replied the great Bomfogus, 'when I have not yet decided which is the proper limb to take the precedence?' And so he died of cold. And so our fair city lies out in the cold, defenseless, while our Bumfogi are seeing which is the proper plan to raise the *Aquila*."

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Correspondence

Ten Thousand Dollars for a Substitute for Ivory.

MESSRS. EDITORS :—On page 135 present volume of the SCIENTIFIC AMERICAN, we observed an article with the above caption, in which our willingnes s to give $10,000 for a suitable substitute for ivory, to be used in the manufacture of billiard balls, was announced. This statement, which appeared in the *Tribune*, is perfectly correct, and was authorized by us, and as its re-publication in your columns may probably have the effect of stimulating the inventive genius of some of your numerous readers, we will give a brief description of the indispensable qualities required in the desired substitute.

The material or composition of the artificial ivory must possess the qualities of *elasticity*, *density* and *hardness;* facilities for being easily turned of a perfect spherical form in the lathe, and for being readily colored and polished. It must not shrink, warp or crack under the ordinary variations of atmospheric temperature. Its specific gravity must be equal to that of natural ivory, so that billiard balls of the same size formed of the two materials, may be of precisely similar weight. Its cost as compared with that of ivory, must be at least *fifty per cent less.* In the event of the discovery of such an artificial ivory as we have indicated, and the above amount of $10,000 being claimed by the discoverer, we should require the right and title to its manufacture and use to be conveyed to us, *exclusively*, by the transfer and possession of the patent right.

If you should deem the subject of sufficient importance we will shortly give a succinct sketch of the various attempts hitherto made to invent artificial ivory, and the causes of their failure. This may probably have the effect of saving much loss of time, expense and disappointment to inventors.

PHELAN & COLLENDER.

63 Crosby street, New York City, Feb. 25, 1864.

[We should be pleased to receive the article alluded to.—EDS.

Improvements in making Steel.

MESSRS. EDITORS :—On page 20 of the present volume of the SCIENTIFIC AMERICAN, I noticed an article on the making of steel, by what is called "the process of cementation." Of late years great improvements have been made in the manufacture of steel in Europe ; and I can not see anything in the way of Americans benefiting themselves by those inventions. First and foremost is Mr. Bessemer's process, also Capt. Uchatius's, M. Bugeny's, Mr. Hurst's, the "Steel Puddling Process," and many others. Each, in its peculiar character, is an improvement on the old way—especially that of Mr. Bessemer's. Crude iron contains 5 per cent. of carbon; malleable iron none ; steel from 0.5 to 1.5 per cent. "Why then cannot crude iron be purified and the desired per-centage of carbon left, without raising its market value to 16 times that of cast-iron?" I presume it can.

To illustrate the subject :—Suppose that a blast furnace yields 200 tuns of iron per week ; to bring that into malleable iron, ready for the blister steel converter, it would take 120 men and 20 boys, 2 refining furnaces, 15 puddling furnaces, 9 heating furnaces, 1 train of puddling rolls and hammer, 1 train of merchant bar rolls, with shears, &c.; also 600 tuns of coal for furnaces. It would cost for the erection of the above $100,000. Then we would have to put the merchant bars into the blister steel pots for nine or ten days, until they attained to a white heat; then we would have to cut them up and melt them in the cast steel pots, to bring them into cast steel ingots. It would require 4,750 crucibles, with their stands and lids, 200 men, 60 boys, 700 tuns of hard oven coke, and 760 separate melting furnaces, at a cost for their erection of $160,000.

Now contrast this with Mr. Bessemer's process, where it would only be necessary to have two 7-feet converters, made of boiler plates lined with fire-bricks, and a hammer or a train of rolls, as the case may be. It would take 8 men for the converters, and the same number for the hammer and rolls as in the malleable iron department. You could have malleable iron or steel with any per-centage of carbon you please, and with any amount of tensile strength required, up to 70 tuns per square inch. Then it has been found that iron, containing from $\frac{1}{4}$ to $\frac{1}{2}$ per cent. of carbon, and capable of bearing from 90,000 to 100,000 lbs. per square inch, is most suitable for steam boilers, as it will stand punching and flanging like a sheet of copper. For instance, such boilers as are in use near Manchester, England, and are working under a pressure of 100 lbs. to the square inch; they are 30 feet long by 6 feet 6 inches in diameter, and $\frac{5}{16}$ in thickness. Where lightness and great strength are required, this process should not be overlooked. With the proper use of this metal we should not have any of those heavy useless iron-clads of which the United States, England, and France seem to be so proud.

The following is a table showing the tensile strength of different kinds of steel, experimented upon at Woolwich, England :—

	lbs. per square inch.
Capt. Uchatius's cast steel	90,000
Ordinary cast steel	128,000
Krupp's steel gun	129,000
Mersey puddled steel	94,000
Best Sheffield cast steel	130,000
Bessemer's hammered steel	160,000
Mr. Mushet's gun metal	103,500

The tensile strength of Bessemer's iron, experimented on by Col. E. Wilmot, at Woolwich, England, is as follows:—

	lbs. per square inch.
Cast or unhammered iron	41,242
Hammered or rolled iron	72,643
Flat ingots, rolled into boiler-plate iron	68,319

The tensile strength of the best Lowmoor or best Staffordshire iron is 64,200 lbs.

Although Bessemer's iron is perfectly malleable, it is nevertheless in a crystalline state, and ought to be brought under the hammer or rolled, as the table will show. The hammering and rolling have the effect of adding one-half to the strength of iron, or in the ratio of 18 to 32. One 17-feet converter will convert $2\frac{1}{2}$ tuns of iron into steel in 30 minutes.

W. G.

Litchfield, Conn., Feb. 20, 1864.

A Mountain of Salt in Louisiana.

MESSRS. EDITORS:—I notice that, on page 103, of the present volume of the SCIENTIFIC AMERICAN, in speaking of "Mineral Salt," you say that "no other country yet known yields this peculiar product." Enclosed I send you a specimen from the celebrated Salt Mountain, situated about six miles west of New Iberia, La. It was only discovered in August, 1862; but it was the source from which the rebels of the Southwest supplied themselves. I assisted in destroying their machinery for mining and a large quantity of salt that had been mined, of which the enclosed is a sample. The rebels were sending about 300 barrels per day into the Confederacy. It seems that the whole mountain is one pure lump of salt; there being but very little soil over it. I saw larger quantities of it at Vicksburg and Port Hudson, when they came into our possession. I have no doubt that, when the war is over, this mine will be worked to great advantage by whoever secures it.

E. S. HULBERT.

Bernardstown, Mass., Feb. 17, 1864.

The Call for a Horseshoe.

MESSRS. EDITORS:—The extensive influence and circulation of your invaluable journal has been made strikingly apparent to me during the past few days. My proposition to pay a premium for a horseshoe which any person accustomed to handling horses, shall be able to put on and take off without the aid of a smith—which shall be light, simple, safe—which shall remain firm in its place while the horse is striking a 2·40 gait, and yet not hurt his foot—was copied from my own paper into the SCIENTIFIC AMERICAN. (See page 88, present volume.) In about a week afterward, I began to "hear from it;" at this present writing I have a file of some fifty letters on the subject, hailing all the way from Montreal to Tennessee, and "still they come!" Two only of the whole number contain drawings in the rough, showing the idea. The others variously say: "*Eureka*!—I have found it!" "I can do it!" "I *am* doing it!" "I shall soon do it!" "I am experimenting upon it!" &c. Some of my correspondents have been considerate enough to enclose a postage-stamp to prepay a reply, (and to all such I *have* replied); but the majority neglect that obvious rule.

All this is needless. Let those who feel interested in the matter understand that the thing desired is not *easily* accomplished. The solution of this problem will be quite an achievement, but it cannot be done in a dozen or fifty different ways, and *all* of them "safe, simple and effective." A few of my correspondents desire me to pack up my carpet-bag and go directly and see them—a proceeding which, however agreeable to the parties, would be both expensive and very uncertain in its results.

If those who have taken the trouble to write to me, will attentively read the original proposition, go to work and accomplish the job, if they can; *testing* it thoroughly and patiently before claiming they have done it, and without fear that others will do it before them and thus receive the premium—then they can communicate actual results to me and will be duly attended to. The proposition was made in good faith; but the terms must be *exactly* and *literally* complied with.

EDITOR OF THE "NATIONAL EAGLE."

Claremont, N. H., Feb. 20, 1864.

What is Sound?

MESSRS. EDITORS :—Would there be such a thing as sound were there no ears for the vibration of the air to act upon? As this has been discussed a great deal in our little circle, without any definite conclusion, your answer would be gratefully received.

E. L.

Cincinnati, Ohio, Feb. 13, 1864.

[In all discussions, the first point to be settled is, whether the matter in dispute is a questioned fact or statement, or whether it is the meaning of a word If the latter, the question is to be settled by a refer ence to authorities. No man can affix a new, arbr trary meaning to any word. Words have the mean ings which have been assigned to them by the usage of good writers, and they can be properly used only with the significations thus established. By referring to Webster you will find that the word "sound" has two meanings. It means the impression made on the ear by certain vibrations in the air, and it is also used to signify the vibrations themselves. There would, therefore, be such a thing as sound were there no ears for the vibration of the air to act upon.—EDS.

Steam on the Tow-path.

MESSRS. EDITORS:—In this progressive age, it would appear singular that there has been no efforts made to substitute the iron horse for that raw-boned animal that slowly drags his life away upon the tow-paths of our numerous canals. A very slight modification or alteration would be necessary, before this revolution could be accomplished, and I think we may look for its fulfilment at no distant period. Along the line of the present tow-path the iron rails could be laid, and for convenience the heel path or opposite bank can be similarly accommodated, resulting in what is now considered the *par excellence* of rail-roading—a double track, and with all its well-known advantages. The same system of stations, switches, and time-tables, &c., which exist on our inland railroads could be introduced, and instead of the one solitary boat now seen creeping along at a snail's pace, the twin relic of the stage-coach of the past, they would number the capacity of the engine to carry them along at a rate of ten to fifteen miles per hour, at a cost of not exceeding that of the single boat with the horse-flesh propelling power of to-day. The difficulties of ascending grades, or the passage of locks, could be easily overcome by having a boat in the van of the train, which we might call the tender, provided with a track on its deck, upon which the engine could be placed, and rise to the succeeding level through the lock. A turn-table would be necessary below and above each lock and the tender with its track on deck, should be sufficiently low to correspond with the level of the tow-path, to facilitate the loading and unloading of the engine. This system has the advantage over the introduction of propellers, from the greater amount of tunnage that an engine on the rail can draw, which is impracticable for the propeller in such

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shallow water, without washing the embankments away by the great agitation of the water. I think if you were to suggest some ideas bearing upon this subject, it might lead to some important results.

JOHN LIPPINCOTT.

Pittsburgh, Pa., Feb. 27, 1864.

[Our correspondent's idea is not new, but as this is eminently the age of wonders, it is not impossible that the revival of the idea will meet with favor from some one interested.—EDS.

Packing Steam Pistons.

MESSRS. EDITORS:—I recently read in the number of your valuable journal, published on Jan. 16th, (page 43 of the present volume) an excellent article on the errors of packing steam pistons. But the barbarism of setting the packing out too strongly by springs is far exceeded on many boats on Western waters by the plan in very common use there, which is, to have the piston head turned slightly conical; and the rings finished on the inside to fit this cone, on the outside to fit the cylinder. The follower is then screwed home with all the leverage of a two-feet wrench, and there fastened with temper screws. When the packing gets leaky, the literal "mashing-up" or "upsetting" of the metal, to use a technical term, together with the increase in size from being forced further upon the cone, is depended upon for obviating it. Here, the inclined plane, the screw and the lever are employed to produce a tremendous pressure, which is altogether unnecessary.

In no part of mechanical engineering is there so much misconception, as of the amount of pressure required to render a piston steam-tight. I remember to have seen the piston of a cylinder—twelve inches bore, and thirty inches stroke—moved freely back and forth with one hand, when unshipped from the connecting rod, and the packing removed from the piston; it was perfectly steam-tight under a pressure of seventy-five pounds to the inch.

In packing piston-rods, I have found it an excellent plan to cut a strip of thick, heavy rubber; in width, a little more than the depth of the box, and in length, just sufficient to line it. The packing yarn is placed between this and the rod. The constant spring of the rubber keeps the packing close upon the rod, with less pressure from the gland than is ordinarily required. It also compensates for any slight variations from a true line in the engine—a great advantage when boats are built so slightly that the loading and unloading is constantly deflecting them, as is the case here.

In conclusion, allow me to express the pleasure I have received from a perusal of the sound mechanical views you have expressed on the above and kindred topics. They cannot fail to do good wherever read. My fervent wish is that your valuable paper may yet have ten times the circulation that it already has, among mechanics and engineers.

AN ASSISTANT ENGINEER.

[We thank our correspondent for his compliments, and also for the information he has forwarded us. The barbarism he mentions cannot be too strongly condemned, and it is mainly in the hope that this letter will be the means of suppressing the evil that we publish it. We hope that all engineers, wherever situated, will expose the abuses of the profession by writing us such sensible letters as the above.—EDS.

Breech-sights for Field Guns.

MESSRS. EDITORS:—Please to call the attention of inventors, through the columns of your well-known paper, to a very annoying defect in the breech-sight, now in common use with field guns in our army. One of the primary objects in using a breech-sight is to keep the line-of-sight either in, or parallel to, the vertical plane of fire; that is, the vertical plane passing through the gun's axis. But with the exception of the pendulum hausse (which practically fulfills the required conditions) all varieties of the breech-sight keep that line in a plane perpendicular to the axis of the trunnions; the gun's axis being either in, or parallel to, this plane. Now, it is very evident that, when the trunnions are not horizontal—which is generally the case with field guns—the line-of-sight will make an angle with the vertical plane of fire. If the right trunnion is the lowest, the plane of fire will incline to the right of the line-of-sight; if the left trunnion is the lowest, that plane will incline to the left. The amount of divergence, in yards, can be found (to a near degree of approximation) by multiplying the range, in yards, by a fraction whose denominator is 3,600, and whose numerator is equal to the number of degrees of inclination of the trunnions, multiplied by the number of degrees of elevation. For example: Let the required range be 1,200 yards; the angle made by the axis of the trunnions with the horizontal plane, 6 degrees; and the elevation 5 degrees; then 1,200 yards $\times \frac{6 \times 5}{3600} = 10$ yards—an amount too great to be overlooked. The above method is deduced from the following formula, which is exact when the line-of-sight is horizontal, to wit: "tan. a sin. b=tan. x." In this formula a represents the angle of elevation, b the angle of inclination of the trunnions, and x the angle included between the vertical plane of fire, and the vertical plane of sight.

When representing to an officer, lately, the necessity for a more general introduction of the pendulum hausse, for the above reasons, he argued that *that* would not remove the difficulty; "for," said he, "in the 'Instructions for Field Artillery,' which were prepared by a board of artillery officers of the regular army, you will find—immediately following a minute description of the pendulum hausse, as the usual instrument for pointing field guns—an enumeration of the causes which disturb the flight of a projectile; and it is stated that one cause of deviation is the inclination of the plane on which the wheels of the carriage stand." Although I replied that it was evidently a mere oversight on the part of those officers, in not modifying the statement to suit circumstances, he would not be convinced.

I trust that the influence of the SCIENTIFIC AMERICAN will be brought to bear in this matter; and that we shall leave our camp-of-instruction with appliances which will enable us to profit by what we shall have learned there; and not to pass through another campaign with pointing instruments which are almost worthless.

JOSEPH SPOR,
Battery H, 1st Penn. Art.

Camp Barry, D. C., Feb. 20, 1864.

THE TRAITOR'S "COAT-OF-ARMS."—Joseph Schofield (an Englishman by birth, but an adopted citizen of the United States, now residing in Iowa, and who justly boasts of having two sons in the army, one of whom has just re-enlisted to fight for the flag of his country) sends his annual subscription to the SCIENTIFIC AMERICAN for another year; and at the same time he soundly berates those who do not stand up for the Government. He closes his letter with the following pungent remarks:—

"The traitor's 'coat-of-arms' consists of *a flea, a fly, a magpie and a side-of-bacon.* Explanation:—A flea will bite either the quick or the dead; so will a traitor! A fly 'blows,' corrupts and contaminates all it comes in contact with; so will a traitor! A magpie is always chattering, talking and lying; so is a traitor! A side-of-bacon is never 'cured' till it is *hung;* neither is a traitor!"

THE "GALENA" READY FOR SEA AGAIN.—The iron-clad *Galena*, which was so riddled at Fort Darling (Va.), has had her armor removed, and is about to go into commission. With her armor on, the *Galena* made eleven knots, and it is expected that a much higher rate will now be obtained. She is 215 feet long, 35 feet beam, and draws 11 feet of water. She has 2 engines, with 48-inch cylinders and 3 feet stroke, driving a screw 11 feet diameter and 22 feet pitch. The stroke is multiplied by the plan of the engines so that the crank has 1 foot more stroke, or 4 feet altogether.

THE London *Engineer* publishes a long account, accompanied by tabular statistics, of the number and character of the boiler explosions occurring in England in 1863. These tables are the result of the labors of the Manchester Association, and are of very great value as regards exhibiting the physical character of the ruptured boilers. We shall shortly publish a condensation of this report, believing that it will prove of great interest to the profession.

THE droppings from stove-pipes, where wood is burnt, leave very persistent stains. Oxalic acid will remove the iron, and when the spot is then well washed, ammonia may take up what is soluble.

Photographic Items.

The art of photography is so simple and so easily acquired that it seems to be especially adapted as an employment for women. Its manipulations require a certain delicacy of touch, gentleness and quietude which are the natural attributes of females. No part of its attendant labor is rough; many of its operations may be done in a sitting posture. It is by no means as difficult or laborious as ordinary needle-work; while its various operations and processes present to the mind objects of unceasing interest. In England there are many women engaged in the art, both professionally and as amateurs. The exhibition gallery of female photographic artists, Pall Mall, London, is one of the finest establishments in that city.

The "tannin" dry-plate process is now extensively employed for taking landscape pictures. The London *Photographic News* notices (in its last number) some splendid samples done by this method; size of the pictures 16×18 inches. The deepest shadows are very transparent and there is a complete absence of chalkiness in the lights. The editor says that he has rarely seen any architectural photographs so fine.

The dry process is particularly adapted for amateurs, because the plates may be prepared during leisure time, either by day or evening, and stowed away, ready for future use. Pictures may then be taken, by simple exposure of the plates in the camera; after which they may be again stored until leisure permits their development and printing. For excursionists nothing can be more admirable than a camera and a stock of these sensitive plates. What treasures of art and beauty are yet to adorn even the cottages of the lowly, when this wonderful art becomes generally employed! To the young it presents a wide field for instruction and absorbing amusement.

A recently suggested improvement in the tannin process is as follows:—20 grains of gum arabic; 20 grains sugar; one grain carbonate of soda, dissolved in 1 ounce of distilled water; 20 grains of tannin, 1 grain carbonate of soda, in another ounce of distilled water. Keep in separate bottles, and in summer add to each a few drops of spirits of wine. Equal parts of the above are mixed, for use, and merely poured once over the washed plate from an upper to a lower corner and run off to waste, drained and allowed to dry. The time of exposure in the camera is rather more than for a wet plate.

Faded yellow photographs may be restored in a few minutes by immersing the prints in a bath composed of 1 grain of bichoride of mercury to the ounce of water.

M. Disderi, of France, recently brought suit for damages to the amount of $12,000 against certain publishers who had copied some of his most popular photograph portraits. The court held that photographs were the result of mechanical processes only, not the fruits of the thought, intelligence and genius of the producer, and consequently not subject to the protection of the law, like paintings and other works of art; hence the reproduction of such photographs was not an act of piracy, and M. Disderi was accordingly non-suited. In England there is a sort of copyright law for photographic pictures. They may be secured by registry and the selling or production of copies, except with the consent of the photographer or publishers, is illegal. There ought to be such a law in this country.

Mr. Winfield, an experienced English photographer, is said to excel all his compeers in the art. He does not require immobility in the sitter, but directs him to move slightly, so that all the lines and boundaries of his form shall be modified and softened. The ugly features of a photographic likeness are by these simple modifications entirely removed. It is not new to take photographs "on the move." With paper prepared to the proper degree of sensitiveness, even the dashing wave and its scattering spray are caught in the act. As for ordinary portrait photography, we believe it to be generally acknowledged by Europeans that, for softness, brilliancy and artistic effect, the American pictures are not surpassed in the world.

SOME farmers of Vincennes, Ind., wish to find a market for flax lint. Who can inform them of the price paid and disposition to be made of the lint?

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Improved Cultivator.

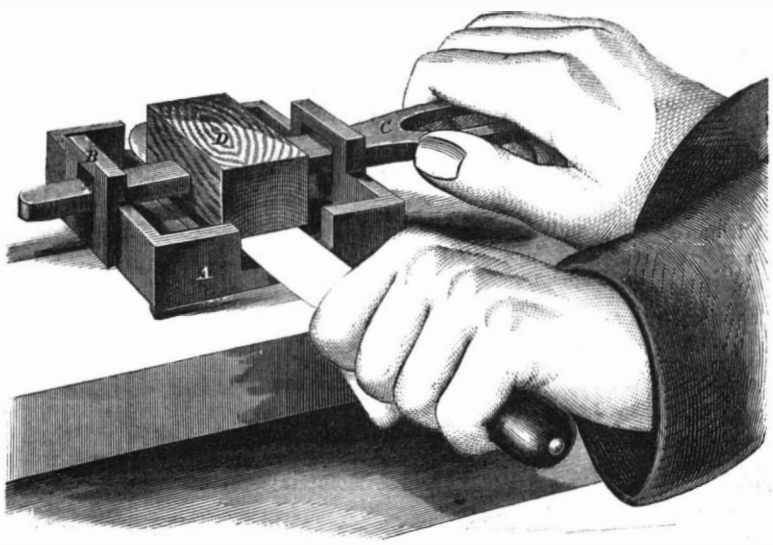
This form of cultivator is one that materially aids the farmer in his labors, for by the use of it a great deal of hand labor is dispensed with. At the present time this feature is of much importance, for farm hands are scarce as well as expensive. The cultivation of the growing crops is effected by this cultivator in the following manner :—The frame, which is suspended on the two wheels, carries two hanging bars, A, on its axle; these are jointed to the beams of a gang of cultivators, B. The cultivators do not follow in line with each other, but alternate so that they embrace either side of the crop ; or they may be adjusted so as to pass upon one side alone, should such a course prove desirable. These cultivators have, from their being suspended, a swinging motion, or are capable of being moved from side to side accordingly as the operator directs them; the draught is directly on the cultivators, as the whiffletrees are connected to the bars, A, by brace rods, C. The two gangs of cultivators are both connected to each other sideways by a bar, D; this keeps both at the same distance apart, but permits the operator to elevate one gang in case of meeting with any obstruction, while the other is continued at work. There are also two staples and hooks, E and F, in both the cultivator and the frame on the wheels ; by these staples the cultivators are raised if desired, so that the machine may be transported from one place to another without any trouble.

MITCHELL'S CULTIVATOR.

This cultivator will be found useful in all places, and it is a desirable addition to the already long list of machines for farmers' use. It was patented through the Scientific American Patent Agency on Dec. 1st, 1863, by Samuel H. Mitchell, of El Paso, Ill.; for further information address him as above.

Improved Knife-cleaner.

This convenient little utensil will be found a great improvement over the ordinary method of cleaning knives, which is, we believe, to use a rag, a board, and, as we are told by an exchange, sometimes the half of a potato. These make-shifts are all superseded by this simple device which accomplishes the purpose much quicker and better, with less labor, and without soiling the hands. In addition to these virtues it always cleans the knife across the blade, thus sharpening it as well as imparting a high polish. The method of using it is fully shown by the engraving ; the utensil itself consists of a light cast-iron box, A, having recesses, B, through which a rubber bar, C, passes ; the knife sets on a base under the rubber, D, which is made of hard wood ; that substance being found the best for the purpose ; the rubber is then drawn rapidly over the knife in an obvious manner. The knife itself remains stationary, except to be moved so as to bring all parts under the action of the rubber. The box is filled with a solution of bath-brick and water so as to cover the knife, and as no waste takes place with this cleaner, one bath-brick will last ten times as long as by the old-fashioned and wasteful methods heretofore practiced. The whole affair weighs but half a pound, and is an excellent thing for the purpose. An application for a patent is now pending through the Scientific American Patent Agency. For further information address Egbert P. Watson, Box 773, New York City. See advertisement on another page.



A NEW KNIFE-CLEANER.

A HINT WORTH REMEMBERING.

No better illustration of the value of simple inventions can be found than one afforded by an instance which lately came to our notice. A gentleman who was a large manufacturer of furniture recently called at this office with a small wooden block in his hand, which was a certain portion of a bedstead. This block, or model, he desired to patent. We expressed our incredulity at such a trivial matter being worth patenting, and asked how much he would probably save on each bedstead by adopting it in lieu of the parts now used.

"Well," he said, "possibly *three cents* on each bedstead."

"What does that amount to, in the course of the year."

"Why, sir," the gentleman replied, "this simple thing that seems so unimportant to you is worth hundreds of dollars to me annually, and I have just such another little matter in my mind now, that will only save five minutes' work on a thing that is extensively used; and I anticipate as much profit from it."

Such testimony as this is most valuable to inventors and patentees. When a manufacturer voluntarily comes forward and pays the fees necessary to secure a patent on so simple an improvement in his business that he knows can only save *three cents* on each piece it is applied to, he not only shows his own sagacity but gives convincing proof that small things are not to be despised because they seem commonplace.

A New Fallacy.

"Leache's perpetual-motion machine, which has turned the heads of all the mechanics in Northern Vermont, has been sent to New York, where the keenest of the Gothamites will be invited to expose the humbug, if such they can prove it. It consists of a wheel seven inches in diameter, to which are attached twelve arms at right angles, and to each arm a ball weighing half an ounce. These arms are all connected by twenty-four cords, two to each arm, and are so arranged that the falling of one ball affects the other immediately behind it, and so on apparently till the machine is worn out."—*Exchange.*

[We have been looking for the new "perpetual-motion" man for several days; but up to the time of going to press he had not arrived at our office. A self-operating machine is something we have never seen, and we are very desirous to have our curiosity gratified. Bring on your "perpetual motion!" —Eds.

How to insure Defeat.

In the late disaster at Olustee, Florida, whereby the Government lost a battle and 1,200 brave men were killed and wounded, one regiment at least was demoralized before the engagement by a piece of folly on the part of some officers whose names are not given. As related by a correspondent of the *Tribune*, the case was as follows :—"The 7th New Hampshire had so deadly a fire poured into them that they broke and fell back in confusion. Dissatisfaction had been created among the men by depriving them of the 'Spencer repeating rifle' and by issuing, in lieu of this formidable weapon, Springfield muskets in a damaged condition. Unable to protect themselves with such guns, one wing of the regiment gave way and could not be rallied, while the other wing, which still retained the repeating rifle, maintained its position until the ammunition was exhausted, when it too was obliged to fall back."

Such a record as this—if the above account is true—is disgraceful in the extreme; when Government goes to the expense of providing these weapons for the soldiers, what business have dolts in gold lace to deprive them of the means of self-defense?

The Scarcity of Laborers.—For the last year or two, since the country has been so thoroughly drained of men for the war, there has been a great scarcity of laborers. Farmers have not been able to get half enough to put in or harvest their crops; and in every kind of mechanical business there has been the greatest difficulty in getting operatives, and those who are obtained, even the most unskilled, will work only for the highest wages. The supply of laborers by immigration is not sufficient to meet the increased demand. In this emergency why not look to Canada for a stock of laborers? The supply is greater there than the demand, increased by crowds of cowards who have fled there to avoid military service; and wages are low. The prospect of steady work and higher wages would induce many of the Canadians to emigrate to the States, if the facts could be put before them and some suitable effort made. The Canadians are intelligent, good-natured and valuable workmen in every respect. We don't want to invade Canada, but if an army of Canadian laborers would invade New England they would meet with a warm reception. The women may come too, and would find abundant employment in the factories and kitchens while their brothers were at work in the shops or on the farm.

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THE INDIA-RUBBER EXTENSION CASE.

On page 152, present volume of the SCIENTIFIC AMERICAN, we alluded to the fact that an application was now pending before Congress for the extension of the Goodyear india-rubber patents. We stated also that we intended to oppose the extension. To those of our readers who are familiar with the position taken by the SCIENTIFIC AMERICAN in the famous extension case of the Woodworth planing machine patent, it is scarcely necessary for us to explain the reasons why we are opposed to such special legislation on the part of Congress in regard to patents; but for the information of those who are not so familiar with our views on this subject, we will briefly explain the theory upon which we ground our opposition.

It is generally admitted that the United States patent system is well modeled to afford all just and reasonable protection to inventors. Under the amended law of 1836 a patent was allowed for a term of fourteen years, with the privilege of renewal for another term of seven years, making in all twenty-one years. To those who look at the matter in respect to the interests of the inventor and the public—always recognizing that the two interests are interwoven and cannot be separated—it is believed that the general law provides adequate protection for both; and after enjoying the rights guaranteed to the patentee by law, it is no more than just and reasonable that the public should then be permitted to avail itself freely of the use of the invention.

We contend that Congress, having in its wisdom devised a most excellent code of laws for the protection of the rights of inventors, ought not, by special legislation, to over-ride those laws by the bestowment of special rights, unless in case of extreme hardship, which cannot possibly apply to the Goodyear extension case. If one patentee is to hold on to his rights in perpetuity, to the exclusion of all others who may wish to make additional improvements, then the door is effectually closed against all progress. There must necessarily be a limit to the term of all patents, else the field of invention is completely hedged about. In respect to the patents o Goodyear, now pending before Congress for extension, the facts are somewhat peculiar; and if there ever were any cases which deserved to be "turned out of doors," this is one of them. It has less merit, if possible, than the famous Woodworth planing machine.

We freely and fully accord to Mr. Charles Goodyear the originality of his inventions. The public has generally acquiesced in this opinion, and we do not propose to dispute this point; it is not at all necessary for our present purpose. The Goodyear patents—one being for an improvement in processes for the manufacture of india-rubber, and the other being for an improvement in felting india-rubber with cotton—were originally granted on June 15th, 1844; re-issued on Dec. 25th, 1849; extended for a term of seven years from and after June 15th, 1858; subsequently re-issued Nov. 20th, 1860; and will expire on June 15th, 1865. Then, unless Congress can be coaxed and cajoled to favor a further extension, the invention will belong to the public on and forever after the last-named date. Like all other valuable patents, they have been made the subject of extended litigation; indeed, no other patents ever granted in this country have so often appeared in our Federal courts. Daniel Webster and nearly all the great legal "lights of the day" have had a strong "pull" at the india-rubber patents; and, if we mistake not, the present able Chairman of the House Committee on Patents—Hon. Thomas A. Jenckes—has employed a large amount of forensic power in defence of Day and others who have been caught in this legal elastic web, as infringers of the rights of Goodyear. At the time the application was made for the first extension of the patent, a powerful opposition was brought against it; and a dray-load of testimony—*pro* and *con*—was brought before Commissioner Holt, who decided, after a patient examination of the case, to allow the extension. His opinion was strictly a judicial act; parties opposed were patiently heard, and there was no reasonable ground of complaint. We then thought, and still think, that the Commissioner did right in allowing the extension, and if any of our readers have a curiosity to read the Commissioner's opinion, they will find it on page 350, Vol. XIII. (old series) of the SCIENTIFIC AMERICAN.

The question now presents itself—what possible interest has the public in opposing the further extension of these patents? We answer, most decidedly, that not only the Government, but also the great public generally, have a very large pecuniary interest to prevent the consummation of this extension scheme. A few facts will clearly demonstrate the soundness of our position. The business of manufacturing india-rubber goods is now immense. Under the protection afforded by the Goodyear patents, the business is divided and sub-divided into various branches, all of which are under contribution to the owners of the patents. In addition to the royalty paid to these owners, the public are compelled to pay a large manufacturer's profit, amounting in the aggregate to millions of dollars annually. Now if these patents are extended beyond the year 1865, millions more will be drawn out of the pockets of the people to support these gigantic monopolists, not one dollar of which can possibly benefit Charles Goodyear, the original inventor and patentee. Goodyear is dead; and the benefit of the extended term of the patent, though ostensibly for his heirs, will result in enriching, at the public's expense, those immense manufacturing concerns, not one of which had anything to do with originating the invention. Whenever the patent ceases to protect them in the *exclusive* manufacture of india-rubber goods, they will still be able, in a great degree, to control the business. Their large and well-ordered establishments—with the market under their control—can successfully contend against opposition *at fair remunerative profits*, beyond which they could not presume, without danger of bringing competitors into the field.

That the people may more clearly see the magnitude of the case as applied to their interests, we enumerate some of the many articles which are now controlled by the Goodyear patents, namely—boots, shoes, leggins, buttons, combs, pencils, knife and razor handles, watch-chains, all kinds of jewelry in imitation of jet, canes, balls, dolls, cups, straps for bills, washing-machine rollers, horse and carriage covers, car springs, hose, steam engine and other packings, belting, all kinds of clothing, &c. Now here is a chance for the people to save themselves from at least one form of taxation. Let all feel it to be their interest to oppose this patent extension. Write protests to your Representatives and Senators—circulate petitions—get local newspapers to write against it; and then, in the face of a strong public opinion, Congress will assuredly reject the claims.

AIR-PUMPS AND CONDENSERS.

The greatest confusion of ideas concerning the functions of air-pumps and condensers exists in the minds of machinists and engineers unfamiliar with the construction of low-pressure engines. Very many individuals of this trade have worked all their lives in places remote from seaports, or large manufacturing establishments, and have never seen a condensing engine, or even so much as an engraving of one. To such persons the following details may be of some value.

The business of the air-pump is first to remove the air from the condenser so that the injection water for condensing steam can enter, and ultimately remove the water of condensation from the condenser, also vapor and air which leak through the joints, or enter with the injection water. Between the air-pump and the condenser there is a channel-way or passage in the bed-plate on which the machinery sets, and in this channel-way there is a valve opening toward the air-pump. This is called the "foot" valve, presumably because it lies at the foot of everything, there is no other propriety in the name. At one time this valve was made of brass, it is now, in nearly every case, supplanted by square sheets of india-rubber about an inch and one-fourth thick, resting on perforated brass seats; these valves work without noise and are much better otherwise. For marine use the air-pump is cast-iron lined with brass, but when fresh water is employed for condensation, the brass lining is generally omitted. Condensers are of two kinds; the jet and the surface; the jet condenser is most usually employed, and is merely a cast-iron vessel of any desired shape, being made to conform to circumstances, sometimes forming a portion of the engine frame; at others entirely independent of the engine and placed on one side. For beam engines it is round, and of the same diameter as the cylinder which sets on top of it and a little larger in capacity than the air-pump; near the top of the jet condenser there is a large thin plate full of holes about half an inch in diameter, this plate has a rose-headed pipe running up through the center like a piston-rod; it is bent to an elbow about two or three feet below the plate and then runs through the condenser to the outside where there is a valve to regulate the admission of water to the condenser; this valve is called the injection valve, and is controlled by a wheel in the engine room. This is the simplest form of condenser and the one most used, although the surface condenser is gradually coming into favor. The surface condenser consists in exposing a large amount of cooling surface in the shape of tubes, to the action of the injection water. The water does not come directly in contact with the steam to be condensed, but the latter exhausts into the tubes and is condensed by water circulating through the condenser outside of the tubes. In this manner the boilers are always supplied, or supposed to be, with fresh water, for as the steam is condensed to a liquid form again, it is fed back to the boiler and thus used over and over again; in this way salt water raised into steam and then condensed becomes fit for drinking purposes after filtering.

These details and principles are well-known to marine engineers, but to others at a distance from seaports the information will no doubt be acceptable.

A MOST NOBLE PROJECT.

Everything relating to the improvement of mechanics, both socially and intellectually, is of the greatest interest and importance. The welfare of the whole community is most sensibly affected by the degree of cultivation the working classes possess. During the recent disturbance among the machinists' trade in this city, the proprietors of the principal works of this kind came together for mutual protection, feeling that the course adopted by the workmen to secure an advanced rate of pay was not the proper one. This convocation was styled the "Mechanics' Association," and the liberal sum of $100 was charged each member as an initiation fee. So soon as the men returned to work, these employers set about raising the wages of the deserving men; showing by this course that their action towards them was not dictated by parsimony, but wholly from principle. This is not all that was done. Mr. J. S. Underhill and Mr. George W. Quintard, both

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proprietors of large machine-works in this city, conceived the idea of founding a "Mechanics' Library"—one that should be such in reality—a place where all the best works relating to the advancement of the trade could be studied by workingmen, free of charge, or at least at a merely nominal fee, for membership. It is not intended to stock this library and reading-room with modern novels, but with the foreign and domestic scientific journals and books relating to art and the practice of it. Should the scheme be carried out, as we trust it may, it will be of incalculable advantage to the mechanical interests, and a credit to the energetic and benevolent originators of the idea. The sum of $8,000 has been subscribed already; the principal engineering firms are directly interested in the enterprise, for they will reap substantial benefits in the future from the generations of educated men which are sure to arise from such an advantage as this institution will afford.

BREECH-LOADING RIFLES FOR THE ARMY.

We have long been of opinion that one regiment of soldiers armed with good breech-loading rifles would be more efficient than three regiments, perhaps superior to ten regiments, armed with muzzle-loaders. With a breech-loader the soldier consumes but one or two seconds of time in the labor of loading, and he can pour an almost constant stream of balls into the ranks of the enemy. It has been objected that when a soldier could load with so much facility, he would throw away his ammunition in careless firing; but we have never doubted that this difficulty might be overcome by a proper drill. In the case where the soldier can load so quickly, he may be taught to make all of his movements slowly and to take a much cooler and better aim than he will when he hurries through the operation of loading.

Our attention has been called to this subject anew by the reception of a pamphlet written by W. C. Dodge, Esq., Acting Examiner, United States Patent Office, in which the advantages of the breech-loading rifle for army use are very ably set forth. Mr. Dodge cites more than forty officers in our army, including Major-generals McClellan, Hooker, Fremont, Rosecrans, Burnside and Sigel, who approve of the introduction of this class of arms. He also gives the following letter from Col. Wilder, who has tried the guns in actual warfare:—

DEAR SIR:—Your letter of Dec. 25, 1863, is just at hand. In reply, I am ready to urge the expediency of arming all the mounted troops of this army with the "Spencer Repeating Rifle." It is a most perfect weapon, when used by cool men, and I have no hesitancy in saying (after commanding a brigade armed with them for nearly a year) that men so armed can always defeat at least double their number, and my command have repeatedly driven three times their number of rebels. Since using this arm my command has never failed to break any column of troops they have attacked, and have never been driven by any force, no matter how heavily they were massed against them.

At Farmington, Tennessee, in the late raid of the rebel General Wheeler within our lines, four of my regiments broke through and scattered two entire divisions of mounted rebel infantry; fighting on foot and formed in three lines, my men captured their battery and dispersed their entire force. I would respectfully refer you to Brigadier General Crook, commanding the second division of cavalry in this army, who witnessed this fight, and can vouch for its correctness.

At Chickamauga on the 20th of September my brigade of five regiments drove back the rebel column that had driven the 20th army corps, and, alone and unsupported, held the entire left of the rebel army for four hours, and were withdrawn without being pursued.

I could enumerate at least thirty fights in which the "Spencer Rifle" has triumphed over other arms in such apparently overwhelming numbers as to almost appear incredible. They should be made with a ring in the side of the breech-piece, so as to be carried as a carbine. The ammunition being water-proof, is not worn out or destroyed like other kinds.

I believe that if the Government would arm ten thousand mounted infantry with these guns, and put them under a good enterprising officer, they could destroy all the principal railroad lines in the South, and do more damage to the rebellion in three months than fifty thousand ordinarily armed infantry could in a year.

I wish I could see those having authority in this matter, that I might impress upon them the great importance of using these arms.

I am, sir, very respectfully, your obedient servant,

J. T. WILDER.

Nashville, Tenn., Jan. 7, 1864.

A PLAN is being rapidly matured for the establishment of a woolen factory in Milwaukee, on a scale heretofore unknown in the North-west. Such a manufactory, besides being a profitable investment for the manufacturers, will greatly aid in the development of agricultural resources by furnishing farmers with a better market.

HOW THE STERNS OF SCREW SHIPS ARE BORED.

Many mechanics are aware that the hole in the stern of a screw ship is bored out after the ship is planked, caulked, and nearly ready to launch, so that no disturbance of the proper direction of the hole or bore may occur from the fastening of or strain caused by the completion of the rest of the vessel. The operation of boring is thus accomplished: The hole is first roughly cut out by the carpenter through the "dead" (or solid) wood of the stern. The length of this dead wood varies according to the dimensions of the ship. In this rough hole a long iron boring bar is placed, supported by bearings at either end; the bar has an ordinary boring head upon it, which is a circular cast-iron wheel, driven from end to end of the hole by a screw; the cutters are fixed in this head and the bar is driven by a spur-wheel and pinion; sometimes a small engine furnishes the power, at other times "muscle" does it.

The time required to bore out the stern varies with the nature of the job. Sometimes the copper and iron through-fastenings of the timbers run into the hole and cause a great deal of trouble. In the *Dunderberg*, the huge iron-clad now building by Mr. Webb, the length of the dead wood is 24 feet, 7 inches, and the diameter of the hole when finished is 25 inches. This length is run in two hours, cutting one inch on a side at the ends; inside the cut has to be lessened as the bar springs too much to carry it. This is remarkably fast work—about 2½ inches, lineal speed, per minute for the cutter. After the hole is bored, the shaft pipe, made of brass, is inserted; on the inboard end of this pipe there is a stuffing box and gland, and out-board the pipe has a lining of liginum vitæ inside of it, constituting a bearing on which the main shaft works; the shaft is also fitted with a brass sleeve, shrunk on where it passes through the pipe so that it may not be corroded by the action of salt water leaking through. In iron ships, of course, the construction is different and no hole has to be bored; these details relate only to wooden vessels.

REVIVAL OF THE COTTON MANUFACTURE.

In the debate which followed the presentation of the Queen's address, on the opening of the British Parliament, on the 4th of February, Lord Derby endeavored to show that the distress in the manufacturing districts had not been relieved to the extent asserted in the address. But in the course of his remarks he made the following admission:—

"I venture to entertain a hope that the worst and heaviest of the pressure is at an end, and that in the course of a few months we may date a considerable increase in the industry of the manufacturing districts. [Hear, hear.] I may be permitted to say that the anticipations which were formed last year of the expected supply of cotton have been realized to the letter, and therefore we may look with greater confidence at the anticipations put forth by those who say that, towards the beginning of April or May, we may calculate upon a supply of cotton which will be sufficient to maintain the mills in working order for five days in the week throughout the manufacturing districts. . . . . I may venture to say this is a proof of the hopeful spirit which animates the people in these districts, that there are no less than one hundred new mills in the course of erection and being prepared for a start on the revival of the cotton trade, and one of these mills will have no less than 5,000 looms in it."

The same revival is taking place in this country. The Woonsocket *Patriot*, which is published in the heart of the manufacturing district of New England, remarks that there is great scarcity of labor to supply the mills which are resuming operations.

It seems that the high prices of cotton, caused by the war in this country, have so stimulated the cultivation in other places that, in the course of only three years, the product is sufficient to supply five-sixths of the machinery of the world.

In this country, as well as in England, the opportunity of the suspension of manufactures has been employed by mill-owners in the repair and extension of their works, and in the construction of new mills and machinery. The cotton manufacture will soon be in full activity, and on a larger scale than ever before.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Foot Shield for Skates.—Straps are considered by experienced skaters to be the most efficient means for securing skates to the feet, as they insure a firm connection between the foot, boot and skate. There is one disadvantage, however, attending their use, which consists in the pressure of the straps upon the foot, preventing the free circulation of blood, and thereby causing cold feet—a great inconvenience; and in case the wearer has corns, causing a great deal of pain. This invention is designed to obviate this difficulty, and it consists in the employment of a shield constructed of metal or other suitable material, and of such a curved form that it will encompass the foot like an arch, while its ends will rest upon the edges of the sole of the boot or shoe, and the strap or straps pass over the shield and press thereon when the skate is secured to the foot, thereby relieving the same of all pressure of the strap or straps. De Witt C. Winans, of New York city, is the inventor of this improvement.

Machine for cutting Tobacco.—The object of this invention is to produce a simple, compact and cheap machine for cutting tobacco or other material of any desired fineness, so that every small manufacturer is enabled to cut up his own tobacco to suit himself and his customers. The invention consists in the application of one or more oscillating adjustable levers acted upon by eccentrics or cams, and acting on rising tappets in combination with the cutter wheel and with a lever spring catch which acts on the teeth of a ratchet wheel secured to the end of a screw spindle which imparts motion to the follower moving in a suitable box, and through it to the tobacco or other material to be cut, in such a manner that, by the combined action of the adjustable lever, tappets, ratchet wheel, screw spindle and follower, an intermittent feed motion is imparted to the tobacco or other material in the box, and said material is cut up to such a fineness as may be determined by the position of the oscillating levers. The invention consists, also, in the employment of a laterally-sliding nut in combination with the screw spindle, follower and box, in such a manner that by imparting to said nut a lateral motion, the end of the box is thrown open for the purpose of removing the follower and introducing a fresh charge of tobacco or other material to be cut. E. W. Ritterhoff and C. A. Colquitt, of New York city, are the inventors of this improvement.

Machine for stamping Carpenters' Squares.—This invention consists in the employment of one or more rollers, each provided with a series of dies representing the figures and the graduation of the squares or other articles to be stamped, in combination with a smooth reciprocating bed, in such a manner that by the action of the dies the article to be stamped is pressed down flat upon the bed and prevented from springing or bending. The invention consists, further, in the arrangement of a bed resting in a semi-circular cavity or otherwise supported in such a manner that said bed is rendered self-adjusting in a transverse direction, and the inequalities in the thickness of the article to be stamped are compensated. The invention consists, finally, in the employment of an eccentric cam acted upon by an adjustable weight or spring, in combination with the reciprocating bed and stamping rollers, in such a manner that the article to be stamped is pressed up against the rollers with a uniform yielding pressure, which can be regulated according to the nature of the work to be accomplished. H. K. Jones, of Kensington, Conn., is the inventor of this improvement.

Plates for Bank-note and other Engraving and Printing.—Much of the engraving on bank-note plates is produced by what is called transferring impressions from the surfaces of hardened steel rollers, the face of the plate being passed under the roller or the roller passed over the face of the plate several times back-and-forth, while applying a heavy pressure. To enable this to be done successfully it is desirable that the face of the plate have a mellow softness and yet the plate be hard and strong enough to resist the heavy pressure. The plates made of fine iron sometimes used are frequently so stretched in the roll-

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ing operation that, in the successive passages of the rollers the lines of the impressions do not come exactly in the same place, and impressions produced are rendered imperfect; and steel plates are so hard that a good transfer is only obtained by many repetitions of the operation of the rollers, and the rollers soon wear out. It has been attempted to decarbonize the faces of steel plates to give them the requisite degree of softness, but this has not been successful. The object of this invention is to obtain plates which have a desirable softness of surface, and the requisite hardness or strength of body to resist the heavy pressure to which they are subject; and to this end it consists in combining a layer of steel and a layer of fine iron, by welding, casting or any other suitable method of uniting the iron forming the face and the steel forming the back of the plate. Alfred Sellers, of New York city, is the inventor of this improvement.

Life-boat and Pontoon Bridge.—The object of this invention is to obtain a life-boat which may, when not required for use, be compactly folded and stowed away in a small space and still be capable of being readily adapted for use, and possess the advantage of always righting itself if thrown into the water. The invention consists in having a series of air chambers formed of india-rubber, gutta-percha or any other suitable air-tight and water-proof fabric, provided with inflating tubes so arranged that the chambers may be readily filled with air and the latter retained therein, and having a metallic keel attached to the central air chamber, the upper surface of the boat being provided with a netting and the under surface having a rope applied to it; all being arranged in such a manner as to effect the desired end. Edward L. Perry, of New York city, is the inventor of this improvement.

Fastening for Breast-pins.—This invention consists in a single or double U-shaped clasp hinged to the under side of the breast-pin, stud, button, or other similar article, in combination with a point projecting from the under surface of said breast-pin, button or other article, and passing through all but one of the shanks of said clasp in such a manner that when the clasp is turned back, it can be readily hooked over one or both ends of a dress; or the ends of a sleeve or other part of a garment can be readily entered between its shanks, and on closing it down the point penetrates the fabric between its shanks, and the breast-pin, button or other article is firmly retained in the desired place; it consists, further, in the application to a button or other similar article of a double clasp, the main clasp being hinged to the under surface of the button, and the secondary clasp to the last shank of the double U-shaped main clasp in combination with two points, one projecting from the under surface of the button or other similar article, and the other from the inner surface of the secondary clasp in such a manner that one end of a shirt sleeve, or other part of a garment, can be secured in the main clasp and the other end in the secondary clasp, and the degree of tightness with which the shirt sleeve or other part of a garment is fastened, can be regulated at pleasure. Gaspard Buhler, of Newark, N. J., is the inventor of this improvement.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII., to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office. No. 37 Park Row, New York.

BackNumbers and Volumes of the "Scientific American."

VOLUMES I., III., IV., VII., VIII. AND IX.,(NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding VOLS. II., V. and VI. are out of print and cannot be supplied. We are unable to supply any of the first six numbers of the current volume. Therefore all new subscriptions will begin hereafter with the time the money is received.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING FEBRUARY 23, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

41,668.—Packing Projectiles for Rifled Cannon.—John Absterdam, New York City :

I claim, first, Constructing a projectile for rifle cannon with one or more bands or bearings of an anti-friction metal that expands in cooling or that does not shrink in cooling, for the purpose herein described.

Second, Sawing the end of the expanding cup in several cuts diagonally to the axis of the projectile, substantially as described.

41,669.—Manufacture of Gun Barrels.—Walter Baker, Ilion, N. Y.:

I claim as a new article of manufacture the forming of a solid cone seat upon a hollow gun barrel, from the metal at the butt of the same, without welding, in the manner substantially as shown and described.

41,670.—Feed Bag.—Joseph Becker and Wm. Tustin, Philadelphia, Pa.:

We claim, first, The strap, A′, running obliquely under the throat of the animal and fastened by a loop upon the rear top side of the bag, substantially as and for the purpose described.

Second, The sieve or ventilator, F, fig. 2, or its equivalent, at the bottom of the bag, as herein described, substantially as and for the purpose set forth.

41,671.—Machinery to aid in puddling Iron and Steel.—Henry Bennett, Wombridge, England. Patented in England May 18, 1863 :

I claim improved apparatus or mechanism to be used in the process of puddling iron, steel-iron or steel, and constructed substantially as herein more fully set forth and specified.

41,672.—Water Elevator.—B. B. Bignall, Owego, N. Y.:

I claim the reel, B, having the spurs, k k, of nearly the same transverse thickness at the base and top, and the bearings, l l, respectively on each side of the spurs, for the support of the chain, substantially as herein set forth.

I also claim the toothed reel, B, constructed as described, with the main chain, C, auxiliary chain, C′, and bucket, D, all arranged and operating substantially as and for the purpose herein specified.

41,673.—Street-sweeping Machine.—H. S. Blood, New Orleans, La.:

I claim, first, The rotating brush, J, in combination with the dirt-plate, K, provided at its lower end with the elastic strip, M, arranged to operate in the manner substantially as and for the purpose specified.

Second, The endless apron, N, placed in the box or dirt-receiver, L, for the purpose of discharging the dirt therefrom when used in combination with the brush, J, for the purpose set forth.

Third, The operating of the endless apron, N, from the driving wheel, F′, by means of the shaft, O S, gearing, G′ P Q R, and endless belt, V, as described.

Fourth, The operating of the door, W, from the lever, A′, simultaneously with the throwing in and out of gear of the pinion, P, with the wheel, G′, substantially as described.

Fifth, The combination of the rotating brush, J, endless apron, N, and dirt-plate, K, all constructed and arranged to operate in the manner substantially as and for the purpose herein set forth.

[This invention consists in the employment of a rotary brush placed in an oblique position in a mounted frame and used in connection with a curved inclined dirt plate and a dirt receptacle provided with a dirt-discharging apron, all arranged to operate in such a manner that the dirt will be cleanly swept up from the pavement of the street, and discharged at suitable or desired intervals in piles.]

41,674.—Working and using Sugar Evaporators.—Luke W. Bodwell, Ann Arbor, Mich. :

I claim the combination and arrangement of the eccentric shaft and cam, A a, the fulcrum or center of motion, E, the flue, R, sliding plate, f, opening, T, enlargement, S, in connection with the arch, J, combined and arranged as and for the uses and purposes set forth in the foregoing specification.

41,675.—Protecting Lead Pipe against the Action of Water.—Leopold Brandeis, Brooklyn, N. Y.:

I claim the application of hydrogen or any other gas in combination with sulphur for the purpose of producing a sulphite of lead, on which water cannot act, and thereby do away with any danger of lead-poisoning, even if water should be kept standing in such pipe or vessel.

41,676.—Opening and closing Iron Blinds or Shutters.—William H. Brown, Worcester, Mass.:

I claim, first, The combination with a sliding blind of the slats, b, connecting rod, c, lever, G, rack bar, u, and sliding shaft, n, with its gear, m, arranged and operating together, substantially as and for the purposes set forth.

Seconp, The combination with a sliding blind of the lip, e, spring, j, ratchet wheel, o, and pawl, t, for the purposes stated.

41,677.—Cultivator.—C. J. Buchner, Paxton, Ill.:

I claim the combination of the horizontal connecting plate, a, pendent slotted plates, b b and f f, beams, g g, rods, i i, bracing foot bars, G G, and transverse bars, K K, all as herein shown and described.

[This invention relates to a corn-planter of that class which are mounted on wheels and are provided with a driver's seat. The object of the invention is to obtain a plow of the class specified which may be manipulated by the driver with the greatest facility and be completely under his control, and also have a draught equalizer of simple construction to insure an even pull of the team and an uniform draught movement of the machine.]

41,678.—Fastening for Breast-pins.—Gaspard Buhler, Newark, N. J.:

I claim, first, The single or double U-shaped clasp, B, hinged to the under or inner surface of a breast-pin, button, stud or other similar article, and operating in combination with the point, f, projecting from the inner surface of said breast-pin or other article, substantially as and for the purposes herein shown and described.

Second, The application of the secondary clasp, C, in combination with the main clasp, B, points, f f′, and button or other similar article, A, arranged and operating in the manner and for the purpose substantially as set forth.

41,679.—Governor.—John P. Burnham, Chicago, Ill.:

I claim the lever, E, with the slotted link, h, and friction wheel, G, in combination with the rocking shaft, C, and sleeve, g, of the governor, A, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention consists in a slotted link secured to a lever which is suspended from a rock-shaft in combination with an ordinary ball-governor and with a friction wheel, which works within the slotted link in such a manner that when the balls of the governor fly out, the slotted link is pressed up against one side of the friction wheel, and the steam-valve is closed or the effective surface of the sails of the wind wheel decreased, and when the balls sink down, the link is pressed up against the opposite side of said friction wheel, and the steam valve is opened, or the effective surface of the sails increased, and by this means the speed of an engine and wind-wheel can be rendered self-regulating.]

41,680.—Sugar-cane Mill.—Wm. H. Clark, Cincinnati, Ohio, and Walter E. Edgerton, Spiceland, Ind. :

We claim, first, So arranging the connecting gearing of three-roll cane mills, that the minor rolls may be placed and worked with their faces nearly in contact, for the purpose herein described.

Second, Supporting the lower ends of the roll shafts in oil-tight cup boxes, adjustable vertically, substantially as described.

Third, Arranging the stay-rods or bolts, e e, &c., obliquely in opposite directions, as and for the purpose specified.

Fourth, The construction and arrangement of the scrapers, h h, in reference to the rolls, A and C, for the purpose described.

Fifth, The false plate, E, adjustable to the lower ends of the unflanged rolls, B C, and resting against the circumference of the flange of the roll, A, in combination with the adjustable rolls, A B C, substantially as described.

41,681.—Sugar-cane Mill.—Wm. H. Clark, Cincinnati, Ohio, and R. R. James, Rising Sun, Ind.:

We claim, first, In combination with the regular main-pressure roll, D, and delivery roll, F, the use of the fluted feed roll, E, when arranged and operating in connection with the former in the manner and for the purposes herein described.

Second, We claim the hand-hole, i, in the end plate and cap, h, when the latter is so constructed and adapted to the plate as to form in connection therewith a plain face on the inner side, as and for the purpose specified.

Third, We claim the vibrating or self-adapting conductor, G, in combination with either a plain or fluted feed roll, for the purpose described.

Fourth, In combination with the juice channel, j, extending into the triangular space between the rolls, we claim the bridge plate, k, for the purpose specified.

Fifth, We claim the grooves, m, in the end plates and the grooves, n, in the ends of the rolls either separately or in combination for the purpose described.

41,682.—Sofa Bedstead.—Francis Cotton, Brooklyn, N. Y. :

First, I claim tightening the sacking, B, substantially as described for the purpose specified.

Second, I claim the use of the hinged levers, E, constructed as shown, in combination with the sofa, A, sacking, B, secondary frame, C, and rubber springs, h h, in the manner and for the purpose or purposes specified.

41,683.—Door Bell.—Nathan F. Cone, La Crosse, Wis.:

First, I claim, in combination with the bridge or bar, B, the screw-threaded stem, A′, formed or cast in one piece with the bell, A, so as to avoid or permanently close any aperture in the said bell, substantially as described.

Second, In combination with the bell, A, rotating shaft, f, cam, E, frog, G, and one or more hammers, D D′, I claim the bar, B, inclosed within the bell and employed for the attachment of the latter, in the manner herein explained.

[This invention relates to that class of door bells in which the striking mechanism is operated by rotating the knob, and the present improvement consists in dispensing with all external appliances as a means of attachment.]

41,684.—Fixed Ammunition for Fire-arms.—George Conover, Middletown, Conn.:

I claim the combination with the shell, A, of the chamber, B, disk, d, nipple, a, and percussion cap, i, substantially as and for the purpose herein specified.

[This invention relates to the use in fixed-ammunition cartridges, for loading in front of the chamber or chambers of or at the muzzle of a fire-arm, of a second charge of gunpowder, for the purpose of expelling the case or shell of the cartridge through the barrel and out at the muzzle of the fire-arm, in which the cartridge is used ; it consists in a novel mode of applying and igniting such second charge.]

41,685.—Mode of manufacturing Alcohol from Olefiant Gas.—E. A. Cotelle, Paris, France :

I claim forming alcohol from olefiant gas and water by means of diluted acids acting only by their presence without reconcentration or revivification, substantially as herein described.

41,686.—Gang Plow.—F. R. Crothers, Sparta, Ill. :

I claim, first, Hinging the axletree to the frame of the machine so that the former will swing forward of its hinge connection, in combination with the thrusting connecting rod, N, chord or chain, m, and windlass, p, all applied and operating substantially as described.

Second, The use of a stiff rod, N, in combination with a windlass, p, and a hinged axle, D, operating substantially as and for the purposes described.

Third, The manner of attaching the draft pole, P, to the plow beams, substantially as and for the purposes described.

41,687.—Preparation for destroying Vermin.—John W. Dodge, New York City. Ante-dated Feb. 21, 1864 :

I claim the within-described composition, mixed together, of the ingredients herein specified, substantially in the manner and about in the proportion set forth.

[The object of this invention is a composition which will, in every case, kill all kinds of vermin that infest the human head or body, and also cattle and plants, and which is equally effective on bedbugs and fleas.]

41,688.—Machine for making Splints for Barrel Hoops.—John B. Dougherty, Rochester, N. Y.:

I claim the within-described machine for preparing at one operation, hoop splints ready for market, said machine being constructed and operating substantially as set forth.

41,689.—Rocket.—Isaac Edge, Jersey City, N. J. :

I claim a telescope tail to guide and rotate a rocket in its flight, by means of wings fixed to rods held at each end by rings made to slide or close on the rocket and be partly withdrawn and fastened to the end of the rocket when in use, the wings being then expanded and secured from spreading by means of ties or straps, substantially as described.

41,690.—Refrigerator.—John N. Ehrsam, Hoboken, N.J. Ante-dated Feb. 12, 1864 :

I claim the arrangement of the water-chamber, F, covering the whole area of the bottom of the refrigerator, in combination with the ice-chamber, B, and the serpentine pipe, E, connected with and receiving the discharge from said ice-chamber, all as herein shown and described.

[This invention consists in the application to a refrigerator of a salt-water reservoir in combination with the ice chamber and with a serpentine metal pipe conducting the ice water through the salt-water reservoir in such a manner that the temperature of the salt water is brought down to and kept at a low temperature by the action of the ice water passing through it, and thereby an additional refrigerating agent is obtained.]

41,691.—Lime-kiln.—Edward B. English, Philadelphia, Pa. :

First, I claim the arrangement at or near the base of the chimney, of the damper, a, or its equivalent, as and for the purpose set forth.

Second, The chambers, W and X, when formed and arranged in respect to each other, as and for the purpose specified.

Third, The fire-places, F F′, with their diverging sides when combined with the chamber, W, as and for the purpose described.

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41,692.—Turn-over Shirt-collar.—Nathaniel Evans, Jr., Boston, Mass.:

I claim a turn-over shirt-collar with a concave bottom and turned over on a line parallel with said bottom, substantially as set forth and for the purposes described.

41,693.—Churn.—S. D. Frazier, Tekonsha, Mich.:

I claim the combination and arrangement of the central dasher, G, and outer dasher, H, provided with the arms, i i, and angular wings, K K, when the same revolve in opposite directions and are suspended from the top of the churn, substantially as herein set forth.

I also claim the slotted plate, I, in combination with the central dasher shaft, a, and the adjustable pinion, E, whereby the same device answers the double purpose of suspending the shaft and holding the pinion either in or out of gear, substantially as herein described.

41,694.—Skate.—Henry Getty, Brooklyn, N. Y.:

I claim the means of adjusting the parts, E and E′, as herein fully described.

41,695.—Tool for clipping and clinching Horse-shoe Nails.—Joel E. Giles, Marshall, Mich.:

I claim the combined arrangement of the clinching jaws, a b, and cutting lips, D D, arranged relatively with each other and with the levers, A and B (to which they are respectively connected), and with the fulcrum pin, C, substantially in the manner and for the purposes herein specified.

41,696.—Railroad Track-raiser.—Prosper Gillett, Hannibal, Mo.:

I claim the lever, G, and pawl, F, in combination with the plates, b, and pin, a′ and with the rack, c, and lever, E, all constructed and operating in the manner and for the purpose substantially as shown and described.

The object of this invention is a combination of levers with oothed rack provided with a suitable toe, whereby a considerable power can be exerted on the track to be raised, said levers being so arranged in relation to each other and to the toothed rack that by the action of one lever said toothed rack can be released and dropped to its original position.]

41,697.—Gas Stove.—James S. Gray, New York City:

I claim, first, The combination of the wick tube, the vapor tube, the valves, the wire-gauze screw, and the heater-cap, with the central air tube, substantially in the manner described for the purposes set forth.

Second, The central tube, K, combined with the outer tube, J, as set forth.

41,698.—Clothes Frame.—John Greek, Evansville, Ind.:

I claim the combination of the post, A, the hubs, C C the arms, b b′, jointed together at or near their extremities, and the cord, D, passed through or around both the upper or lower members of the arms, all as hereinbefore described and for the purposes specified.

41,699.—Rotating Valve for Steam Engines.—W. R. Greenlea, Silver Creek, N.Y.:

I claim, first, Constructing an oscillating valve with induction and eduction passages so arranged around its periphery that the steam will enter at one end and exhaust at the opposite end of each valve, substantially as described.

Second, A tapering or conical valve having induction and eduction passages arranged around its periphery, which are alternately opened at opposite ends of the valve, substantially as described.

Third, The combination of end-receiving and end-discharging valves with their shells, B B′, constructed with circular induction and eduction passages, a a a b b b, substantially as and for the purposes described.

Fourth, I claim the arrangement consisting of the valves, F F′, screws, G G, arms, i i, connecting rod, K, and handle or lever, L, substantially as and for the purpose set forth.

41,700.—Self-feeding Blacking Brush.—Gideon Hamilton & John Post, New York City:

We claim, first, The fountain handle, B, of a blacking brush, so constructed as to be filled with liquid blacking and to discharge it at pleasure through the tubes, m, substantially as shown and described.

Second, The valve, h, the valve stem, i, the thumb handle, k, the combined spring and stuffer, a, when used substantially as and for the purpose described.

41,701.—Metallic Shank for Boots and Shoes.—Edward Heaton, New Haven, Conn.:

I claim the combination with a metallic shank of an auxiliary spring, substantially in the manner and for the purpose specified.

41,702.—Lamp.—James Higgins, Cambridge, Mass.:

I claim the combination of the two concentric elliptical tubes, f g, the circular cup, D, provided with an elliptical flange, d, and the circular removable plate, A, provided with an elliptical guard, k, all the said parts being constructed, arranged, and employed in the manner and for the purposes herein specified.

[By this invention a much larger and more brilliant flame may be produced, and the lamp adapted to burn as brightly when most of the oil is exhausted as when full.]

41,703.—Smut Mill.—Simeon Howes & A. Babcock, Silver Creek, N. Y.:

We claim so constructing a smut mill having two stationary cylinders that a central draft of air from the bottom thereof, shall be forced or drawn upwards through the casing of the scouring beaters, and also a draft between said casing and the outer casing of the mill, both drafts uniting in a fan chamber directly at the top of the scouring apparatus, and centrally thereof, substantially as described for the purpose set forth.

41,704.—Turning Bayonet Sockets.—John Humphreys, Millbury, Mass.:

I claim the combination and arrangement of the rotary cutter head or stock, G, and the slide rest, F, with the tool carriage, D, and the mandrel, C, the whole being to operate substantially in manner and for the purpose as specified.

41,705.—Machine for washing Wool, &c.—James Hunter, North Adams, Mass.:

I claim the cylinder, O, provided with floats, D, having an oblique position in combination with the concave, B, and the box or tank, A, for the purpose set forth.

I further claim the combination of the feed apron, F, cylinder, C, provided with floats, D, and the discharge pressure rollers, G G, all arranged for joint operation, substantially as herein described.

41,706.—Machine for coping Sash.—Tisdil B. Jones, Paterson, N. J.:

I claim the combination of gouge, F, slide, D, and lever, C, when constructed and operating substantially as described.

41,707.—Saw-mill.—John L. Knowlton, Bordentown, N. J.:

I claim the employment or use in a sawing machine for sawing ship and other timber in curved and beveled form, of a feed roller, E, arranged substantially as herein shown and described, so as to admit of a vertical adjustment and also of an oblique adjustment relatively with the saw, for the purpose specified.

I also claim in combination with the feed roller, E, thus arranged, a swivel pressure roller, M, as and for the purpose set forth.

[This invention consists in a novel arrangement of a feed-roller, whereby the same is rendered capable of being thrown in contact with or free from the log, and also of being adjusted in such a manner as to cause the log or stuff to be fed to the saw in a direction corresponding with the form of the cut to be made, whether the same be straight or curved, thereby causing the saw to work in line with the cut and avoiding much friction in the working of the former, as well as much wear and tear. The invention further consists in a particular manner of grooving the feed roller, whereby the log is prevented from slipping laterally while being fed to the saw, and in using in connection with the feed-roller a swivel pressure-roller for keeping the log firmly upon its bed while being sawed.]

41,708.—Washing Machine.—William Kyle, New York City:

I claim the relative arrangement of the axles and body or case, and combining the bars as described, the whole operating in the manner and for the purposes set forth.

41,709.—Cultivator.—John Lacey, Chicago, Ill.:

I claim, first, The arrangement of the pivotal bolts or pins, c and d, and the holes, a and b, the movable beams, A′ and G, stirrup, I, and bars, H, for regulating and adjusting the draft of the plows.

Second, The combination of the lever, R, the rest or stop, e, connecting bar, S, bow, T, pivotal bolts, c and d, with the movable beams, A′ and G.

Third, The combination of the bars, H, stirrup, I, and chain, M, with the movable beams, A′ and G.

Fourth, Hinging the rear ends of the movable beams, A′, betweeu the front and rear plows by the pin, c, so as to move such front and rear plows in opposite directions, all being constructed and operating substantially as set forth and specified.

41,710.—Separating and sorting Ores, &c.—Edward Lawson, Island Pond, Vt.:

I claim the sorting or separating of ores and other matter, by placing the same within a cylindrical or other suitable shaped vessel of such diameter that the ore or other matter will be kept in a mass while it is elevated by an upward pressure of a column of water, and by reducing or stopping the pressure of said column of water, the ore or other matter be allowed to separate and dispose itself in layers according to their specific gravity, substantially as set forth.

I further claim the elevating of the sorted or separated ore or other matter, within the vessel aforesaid, by means of a piston interposed between the ore or other matter, and the ascending column of water under pressure, for the purpose of preserving the relative position of the layers or parts of the separated ore or other matter while the same are being discharged from the vessel, as herein described.

[This invention consists in sorting or separating ores and other matter through the agencies of hydrostatic pressure and specific gravity. In carrying out this invention a cylindrical or other suitable shaped vessel of proper dimensions is employed, the lower end of which communicates with an elevated reservoir, the induction pipe being provided with a valve and the vessel provided with a perforated plunger.]

41,711.—Beehive.—Horace Markham, Henderson, Ill.:

I claim having the entrance slide provided with hooks, m, in combination with notches, n, in the hive-front, so as to regulate the size of the entrance aperture, as here shown and described.

[This invention relates to an improved feed-chamber applied to the hive and arranged in such a manner that the bees may, when necessary, be supplied with food with the greatest facility, and the feed-chamber at the same time made to serve the purpose of a robber trap. The invention also relates to an improvement in a slide applied to the bee-entrance, and arranged in such a manner that the bee-entrance may be increased or diminished in area as circumstances may require. The invention further relates to an improved means for preventing insects from obtaining admission into the hive.]

41,712.—Mode of preserving Chopped Meats, &c.—W. C. Marshall, New York City:

I claim, first, The use of cylindrical tubes, A, of cotton or other textile material, substantially such as herein described for the purpose of preserving animal flesh or meat.

Second, The application of elastic bands, B, to the bags, A, after the same have been filled and tied, substantially as and for the purpose set forth.

[This invention consists in the employment or use of cylindriac tubes made of cotton or other textile fabrics, and tied up at the ends like sausages in such a manner that said tubes take the place of the intestines generally used in the manufacture of sausages and that dry dessicated meat chopped or reduced to more or less fineness can be preserved with a saving in labor equal to fifty per cent of that ordinarily required; the invention consists also in the application to said cylindrical tubes, after they have been filled with meat and tied at the ends, of elastic bands made of india-rubber or other suitable material and embracing the tubes at short intervals in such a manner that by the action of the bands the covering tube is always drawn up tight to the meat and no retying of the bands is required as the meat shrinks and its bulk diminished.]

41,713.—Grain Drill.—Anton Maschka, Chicago, Ill.:

I claim in combination with the double oblique seed boxes, P T, arranged respectively in front and in the rear of the seed covers, the levers, A A′, rope, x, and crank shaft, s′, for the purpose of planting the grain at various depths and for adjusting the depths of the seed covers, P′, substantially in the manner herein described.

41,714.—Self-acting Sled Brake.—Calvin E. Myers, Bristol, Vt.:

I claim, first, The combination of the sliding frame, E, draft pole, F, and dogs, H H, all constructed, arranged, and operating in the manner and for the purpose set forth.

Second, In combination with the above, I claim the hook. I, and eye, h, for preventing the movement of the frame, E, as explained.

[The object of this invention is to obtain a simple brake for sleds which will be self-acting and capable of being rendered inoperative, when desired by a very simple manipulation.]

41,715.—Hay-elevating Fork.—D. F. Neikirk, Republic, Ohio:

I claim, first, A hay-elevating fork constructed substantially as herein described and hinged to its handle at a point about midway of the length of its tines, and controlled by means of devices, g k l m, all for the purposes set forth.

Second, A pivotal connection, d, when passed through the fork at a point about midway of the length of the tines, and supported by devices, e f, in the manner and for the purpose described.

41,716.—Washing Machine.—J. E. North, Candor, N. Y.:

I claim, first, In combination with the tub, B, the rubbers, C C′, provided with cavities, c, operating in the manner described and employed in connection with the rod, D, roller, F, and levers, G H, substantially as and for the purposes specified.

Second, I claim the trough, J, employed in combination with the shaft, D, and aperture, b, in the manner and for the purposes described.

Third, I claim the combination with the shaft, F, and rod, D, of the segment, S, and rack, D′, as and for the purpose specified.

[This invention chiefly consists in the employment of a novel system of levers by which the power required to operate the rubbers may be increased or diminished in conformity with the strength of the operator.]

41,717.—Connection for Barrel Rafts.—R. W. Park, Allegheny City, Penn.:

I claim combining the bars forming the can hook by means of the thumb-screws, P P, operating in the slots, M M, when said bars are provided with eyes, H H, at or near their ends, in the manner as herein shown and set forth.

I also claim the adjustable crab (Fig. 3), having several bearings against the chine of the barrels, for holding them end-ways while in the water, and prevent abrasion by means of the crab and swivel bolts, substantially in the manner as herein before stated.

41,718.—Securing Bits in Braces.—Obed Peck, Windsor, Vt.:

I claim the screw, C, passing transversely through the socket, B, and provided with the nut, c, and head, d, the latter being notched to form a projection, f, to fit in a recess, g, in the shank, b, of the bit, substantially as and for the purpose herein set forth.

[This invention consists in having a screw pass transversely through the socket of the brace or bit-stock, said screw being provided with a head which projects laterally from it, and has a notch made in it to form a projection which, by means of a nut on the screw, is drawn into a recess in the shank of the bit, so as to firmly secure the bit to the brace or bit-stock.]

41,719.—Boat and Pontoon.—Edward L. Perry, New York City. Ante-dated Feb. 7, 1864:

I claim the combination of the chambers, A A′, bars, b, swinging keel, D, and rope, E, all constructed and arranged substantially as and for the purpose specified.

41,720.—Hook for fastening Umbrellas.—Wm. H. Richardson, Philadelphia, Pa.:

I claim the hook-fastening for umbrellas and other articles of wearing apparel, constructed and operating substantially as and for the purposes specified.

41,721.—Machine for cutting Tobacco.—F. W. Riterhoff & C. A. Colquitt, New York City:

We claim, first, The application of one or more oscillating adjustable levers, H, in combination with cams, G, tappets, J, lever spring catch, L, ratchet wheel, N, screw spindle, M, follower, O, box, F, and cutter-wheel, D, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, The laterally-sliding nut, P, in combination with the screw spindle, M, and box, F, constructed and operating in the manner and for the purpose substantially as set forth.

41,722.—Baling Press.—Benjamin Roberts, Clintondale, N. Y.:

I claim the combination of the levers, G G, links, F′ F′, props, H H, pulleys, k k, endless rope, n, drum, J, gearing, L L′, and large driving wheel, M, all arranged and operating substantially as described.

41,723.—Apple Mill.—George S. Rust, Chester, Ill.:

I claim, first, Attaching the concaves, D D′, of fruit mills to the ends of pendant pivoted arms, d d′, at an intermediate point between the ends of these concaves, substantially as and for the purposes described

Second, While not claiming broadly alternately vibrating concaves, I do claim supporting said concaves or crushers, by means of pivoted vibrating arms, d d′, in combination with a rototing drum or its equivalent, substantially as and for the purposes described.

Third, The eye-bolts, d d′, serving as hinges and adjusting devices to the concaves, substantially as described.

41,724.—Plates for printing Bank-notes, &c.—Alfred Sellers, New York City:

I claim the manufacture of plates for engraving and printing purposes, composed of a layer of iron and a layer of steel, combined substantially as herein described, the iron forming the face and the steel the back of the plate, as herein specified.

41,725.—Button-hole cutter.—Michael M. Shellaberger, Randolph County, Ind.:

I claim the guide, e, and guard, d, in combination with a button-hole cutter, constructed and operated substantially as herein set forth.

41,726.—Mode of raising Sunken Vessels.—Joseph H. Smith, Cohasset, Mass.:

I claim the application or arrangement of the fore and aft chains, B C, and their sets of reeving eyes, a a, together and with the hull, A, of a vessel, substantially in manner and so as to operate as specified.

41,727.—Fibrous Batting or Wadding.—John T. Stoddard, Plymouth, Mass.:

I claim my improved manufacture of fibrous batting, as made substantially in manner and for the purpose as herein before specified.

41,728.—Cultivator.—James Swart, Hoffman's Ferry, N. Y.:

I claim the mould-board, A, constructed with flat-faced wings, e e, narrow at the base and wider toward their ends, having straight lower edges, f f, and rounded outer ends, g g, all as herein shown and explained and for the purpose specified.

41,729.—Paint Composition.—William Ten Eyck, Pike Township, Pa.:

I claim compounding and mixing together the aforementioned ingredients to form a paint composition, substantially as herein described.

41,730.—Mosquito Canopy.—M. L. Thompson, Brooklyn, N. Y.:

I claim the folding canopy frame, composed of the x bars, a and b, and double cross bars, d and e, to which are attached the cords or lines, f and g, as, and for the purposes specified.

I also claim the arms, h h, and cords, k, in combination with said canopy frame, for the purposes specified.

41,731.—Machine for treating Compressed Cotton and other Fibrous Materials.—Wm. Waukley, Albion Mills, Bury, England. Patented in England, July 30, 1862:

I claim the arrangement and construction of the closed steaming vessel having a perforated false bottom and receiving the steam below said false bottom, substially in the manner and for the purpose set forth.

41,732.—Breech-loading Fire-arm.—James Warner, Springfield, Mass.:

I claim the construction of the semi-cylindrical recess, f, of a diameter corresponding to that of the flange of the metallic cartridge, in combination with the semi-cylindrical breech-piece projection, h, the recess, l, and the hammer, E, as herein shown and described, so that when the breech-piece is open, the cartridge case will be guided in an exact line with the barrel, both in loading and withdrawing the case; and when the breech-piece is closed, the solid portion thereof, or semi-cylindrical projection, will press against the rear of the cartridge shell, while the fall of the hammer will lock the breech-piece and prevent it from being blown open by the accidental rearward bursting of the shell; the premature discharge or striking of the hammer upon the cartridge-pin being also avoided; all as set forth.

41,732.—Hay-elevating Fork.—Seth Wheeler, Albany, N. Y.:

I claim, first, A horse-fork for handling hay and other substance, constructed with curved teeth or tines which converge toward one another and are united so as to dispense with the ordinary cross-head and yet afford a suspending loop or eye, substantially as and for the purposes set forth.

Second, Attaching the tines, d d e e, to the tines, A a a, in the manner described.

41,734.—Harvester.—Wm. N. Whitely, Jr., Springfield, Ohio:

I claim connecting the external or ground face of the wheel, B, with the internal gear, n′, by a convex side rim or projecting portion, j, substantially as described, for the purpose set forth.

41,735.—Foot Shield.—Dewitt C. Winans, New York City:

I claim the employment or use of a shield, D, constructed of metal or other suitable material and of such a form as to encompass the foot while its ends rest upon the sole of the boot or shoe, and placed or adjusted in such a position as to be interposed between the foot and the skate straps to relieve the former of the pressure of the latter, substantially as set forth.

41,736.—Battering or piercing Ram for Naval Offense and Defense.—Jerome B. Woodruff, Washington, D. C.:

I claim, first, The arrangement of the steam cylinder and a hollow piston which passes through a stuffing-box, in a sliding segment, the same being fitted to move up or down in a groove, water-tight, so that the plunger can be changed in its position, while in operation, substantially in the manner herein described.

Second, I claim the plunger, C, the same being inserted at the rear end, and passing through the hollow piston, D, and secured in its place, to be operated by steam-power in the manner described, for the purpose of offense and defense in naval warfare, as specified.

41,737.—Bolting Flour, &c.—J. Wright, St. Louis, Mo.:

I claim, first, The spiral screen, D′, one or more attached to a vertical rotating shaft, A, in connection with a spiral chute, D, also attached to the shaft, A, the screen and chute, being encompassed by a case, E, and all arranged to operate, as and for the purpose herein set forth.

Second, The hopper, F, attached to the shaft, A, above the screen, D, in combination with the stationary scraper, G, and the opening, n, in the bottom of the hopper, for the purpose herein set forth.

Third, The annular troughs, I I, on the base, B, and underneath the screen, D′, and chute, D, when used in connection with the screen and chute arranged on the shaft, A, and the spouts, J J′, for the purpose specified.

[This invention consists in having one or more spiral screens and a spiral chute attached to a vertical rotating shaft and enclosed by a suitable case, whereby the flour, beans, or other substance to be bolted or screened, will be allowed to pass down and over the screen and chute as the latter revolves, and be bolted or screened in the most

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horough manner. The invention also consists in using in connection with the spiral screen and chute aforesaid, a hopper, which is also attached to the screen shaft, has an opening in its bottom, and is arranged to operate with a scraper in such a manner that the flour or other substance to be bolted or screened will be fed properly to the screens. The invention further consists in a means employed for giving a vertical and a lateral shake motion to the screen and chute, to ensure a perfect operation of the same, by preventing clogging, and causing the article, while being screened, to pass freely over the screen and chute.]

41,738.—Lifting Jack.—Ebenezer Young, Camden Centre, Mich.:

I claim the lever, C, provided with oblong slots, c, having notches, d, at its outer end, in combination with the bail, D, and a suitable frame in which the lever, C, is fitted; all arranged to operate substantially in the manner as and for the purpose herein set forth.

41,739.—Potato-digger.—Peter Antonides, Freehold, N. J., assignor to himself and George W. Mayher, New York City:

I claim, first, The fork, F, attached to the front part of the bar, D, when used in combination with the share, C, and screen, E, as and for the purpose specified.

Second, The hooks or curved terminals, d, at the ends of the prongs, c, of the screen, E, substantially as and for the purpose specified.

[This invention relates to an improvement in that class of potato-diggers which are composed of a share with a screen attached to its back erect. The invention consists in attaching to the front part of a potato-digger of this kind a fork, arranged in such a manner as to effect a partial separation of the earth from the potatoes, before the latter fall or pass upon the screen, thereby relieving the screen or greatly aiding it in its work. The invention also consists in the employment or use of an inclined bar, attached to the implement in such a manner that it will serve as a guard to protect the screen from weeds, grass, and similar trash, which prevent it from operating perfectly. The invention further consists in having the outer prongs of the screen at each side formed with hooks at their ends in order to level the ridges of earth formed at each side of the implement as it is drawn along, and to separate the potatoes therefrom, so that they will be left upon the top of the earth.]

41,740.—Horse Rake.—James B. Drake (assignor to A. B., E. F., S. E., & L. B. Sprout), Picture Rocks, Pa.:

I claim the application of the spring, A, to the tooth, B, spool, C, and staple, D, as herein described.

[This invention relates to an approved manner of applying the teeth, whereby they may be elevated with great facility and returned automatically to their working position.]

41,741.—Lock and Latch.—H. H. Elwell (assignor to the Norwalk Lock Company), South Norwalk, Conn.:

I claim the employment or use of a sliding or adjustable pin, d, in the lever, D, in connection with a recess, b, in said lever to receive the inner end of the latch-bolt, C, substantially as and for the purpose herein set forth.

41,742.—Machine for stamping Carpenter's Squares.—Horace K. Jones (assignor to Hart Manufacturing Company), Kensington, Conn.:

I claim, first, The combination of the loose and removable roller, K, self-adjusting bed, G, and carriage, F, constructed, arranged, and operating, substantially as and for the purpose set forth.

Second, The combination of a roller which carries the dies with a self-adjusting bed and a weighted lever, substantially as and for the purpose herein shown and described.

41,743.—Cultivator.—John Lacey (assignor to himself, Conrad Furst and David Bradley), Chicago, Ill.:

I claim the combination and arrangement of the movable adjustable frame, B, pivoted lever, D, segment pinion, C, and rack, h, with pulleys, a, rod, b, and foot levers, k k, the whole constructed and operating in the manner and for the purposes herein set forth.

41,744.—Car Brake.—George S. Miller, Thompsonville, Conn., E. B. Peck, Bridgeport, Conn., and William Olmsted, Thompsonville, Conn., assignors to said G. S. Miller & E. B. Peck:

We claim the employment of the flanges, G H, upon the axle, B, in combination with a double-acting lever, J, and connecting rod, I, substantially as and for the purpose described.

41,745.—Watch-guard or Safety Chain.—Edwin J. Morse (assignor to himself and Josiah D. Richards), North Attleborough, Mass.:

I claim the said watch-guard or chain as constructed of the two series of staple links and the series of grooved blocks, made, combined, and arranged together, substantially as herein before explained.

41,746.—Harvester.—Edgar M. Smith (assignor to Mitchell, Vance & Co.), New York City:

I claim in combination with the main driving and supporting wheels running loosely on their axle or journals, the main gear wheels, D, running loosely on the hubs of said drive wheels, and having a ratchet and pawl connection with each other, substantially in the manner and for the purpose herein described and represented.

I also claim the arrangement of the two setts of plates and boxes, on the opposite sides of the main frame, so that the cutting apparatus may be arranged on either side as set forth.

I also claim in combination with the two setts of plates arranged on opposite sides of the main frame, the curved bar or brace, F, extending from one to the other, so as to leave unobstructed space at I, for the free action of the rake, as described.

I also claim in combination with the loose and shifting main wheels, and main cogged gear, the pinions, b, permanently arranged on the shaft, d, so that said loose and shifting wheels will, when on either side of machine mesh, with said pinions as set forth, whichever end of the machine goes foremost.

I also claim hanging the reel blades, to the reel shaft, by means of the crossed arms, and adjustable heads, hubs, or sockets, for the purpose of enlarging or diminishing the circumference of the reel, substantially as described.

41,747.- Screw Wrench.—George C. Taft, Worcester, Mass., assignor to Thomas H. Dodge, Nashua, N. H.:

I claim the combination in a wrench in which the strain is transferred from the ferrule to the shank as described, of one or more grooves, b, with perpendicular rear and bevelled or inclined front side or sides, with one or more projections, c, of corresponding form, on the rosette, F, substantially as and for the purposes set forth.

41,748.—Grain-dryer.—Henry Wood, Montreal, C. E.; George Henry Fourdrinier, Lyn, C. W.; and Margaret L. Haselden, Montreal, C. E., executrix of Richard Haselden, deceased:

We claim, first, The employment or use for the purpose of drying grain of a cylinder, B, revolving on wheels, a', and hubs, a*, secured to its circumference and provided on its inside with spiral flanges, d, and lifters, e, substantially in the manner herein shown and described.

Second, The steam coils, C, and jacket, E, arranged in combination with the perforated cylinder, B, rotated by means of the friction rollers, a', and with the louvers, F, in the manner and for the purpose set forth.

Third, The rotary cooler, G, provided with spiral passages, j, between two perforated cylinders, i i, and with fan-blowers, k, to which motion is imparted by a sun and planet gear, m m', in the manner and for the purpose substantially as herein specified.

Fourth, The compartment, G*, in combination with the cooler, G, elevator, J, and chimney, H, or its equivalent constructed and operating in the manner and for the purpose substantially as described.

RE-ISSUES.

1,623.—Folding Chair.—John A., William F., & Isaac N. Dann, New Haven, Conn. Patented Jan. 6, 1863:

We claim the combination of bent or curved arms, with the cross legs of folding chairs, when the said arms are pivoted or hinged to the two legs which sustain the front of the seat, and the other or upper end of the arms secured to the back by means of slots, whereby the several parts may be folded into a compact form without disconnecting the said curved arms from either back or legs.

1,624.—Sash and Door Fastening.—Ross Johnson, Frederick, Md. Patented May 29, 1860:

I claim the within-described implement, C j i, as a door and window-sash fastener, substantially as set forth.

1,625.—Sewing Machine.—A. B. & N. H. Shaw (assignees of A. B. Shaw), Swanton, Vt. Patented Dec. 16, 1862:

I claim the combination of the lifting cam and pin, x, with the feed lever, and a spring applied to the said lever, to operate substantially as and for the purpose herein specified.

1,626.—Harvester.—Mitchell, Vance & Co. (assignees by mesne-assignments of John Powers & E. M. Smith), New York City. Patented Jan. 14, 1862:

I claim, first, The combination of the upwardly curved arms, D, and sliding bars, F, when united by a hinged joint, a, substantially as and for the purpose described.

Second, The combination of the outwardly curved arms with the wide-spread bearings or boxes, b, for the purpose of bracing the shoe and finger bar to the main frame in the direction of their greatest strain, substantially as described.

Third, The combination of the sliding lever, N, with the lifting segment, K, and shoe, C, and their flexible connections, o q, for the purpose of raising up, holding up, or lowering, the finger bar and cutting apparatus, substantially as and for the purpose described.

Fourth, The curved, flanged, or angle-iron bars or plates, s t, for uniting the longitudinal pieces, r r, as herein represented and for the purposes described.

Fifth, The guard fingers having backs, h, and ledges, k, extending continuously along the bar so as to present closed surfaces in front and beneath, and formed with channels or grooves, l, extending beneath the sickle bar, and partially around the bolt-holes, l, and open at the back to permit the ready escape of moisture, gum, or other foreign matter, and thus avoid choking or clogging, substantially as described.

DESIGN.

1,903.—Stop-cock.—Henry G. Morris, Philadelphia, Pa.

PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents:—

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

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THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where y questions regarding the Rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

Notes and Queries

S. D., of Conn.—The question of lubricating valves and pistons of steam engines will soon be discussed in the SCIENTIFIC AMERICAN. It tends to injure a steam boiler to refill it immediately after blowing off in winter; the abrupt contraction of the iron, from a high to a comparatively low temperature weakens t would injure the flues to burn them out whether the boiler is full or not; the heat must be so intense to affect the scale that the flue is burnt before it is removed. The deposit you mention can be removed by using a stiff wire brush with short handles linked together like a chain, this can be employed in the shortest turns. It will take some time to do it thoroughly if the flues have been neglected. An eel as thick as a man's thumb and of proportionate length must be a singular fish; we could not account for the presence of it anywhere, much less in a spring on the top of a rocky hill. The eel must have been a water snake.

E. L., of Mass.—Gas stoves are in quite extensive use, and it seems to be generally supposed that they are serviceable in warming rooms, but we have never known of any careful experiments being made to ascertain whether a room is heated more uickly by means of the stove than it is by burning the same quantity of gas in the open air. In both cases the combustion would probably be perfect, and the absolute amount of heat generated would be the same. As, however, heat accompanied by light—intense heat—passes more freely through diathermic bodies than eat of low temperature, the stove would cause a larger quantity of heat to be absorbed by the air, a correspondingly less quantity passing through the air into the walls. But the principal advantage of the stove is probably to prevent the heat from rising to the upper part of the room, as it does in the upward current produced by an open burner. Gas burned in a stove, as well as in an open jet, not only exhausts the oxygen from the air, but generates in its place carbonic acid, and if a large jet were burned a long time in a small room it might prove fatal to the occupants; but we have never heard of a case of death from this cause.

O, P, B., of Ind.—Trees grow by a deposit of new matter each year between the bark and the wood all round the trunk and branches. This deposit is made in the form of cells, and those which are deposited in the spring have their cross walls absorbed and form minute tubes extending the whole length of the tree. But those which are formed late in the season become filled with solid matter. Thus each year's growth of the tree is an envelope, the inner portion of which is porous, while the outer portion is solid wood. When a tree is cut down it is easy to ascertain its age y counting these yearly rings. An estimate formed by counting the rings in an inch of section near the bark, and multiplying these the number of inches in the semi-diameter, would mislead, as he rings are generally broader near the center.

O. S. D. Mass.—You can procure photographic gun-cotton of Seely & Boltwood, 244 Canal street, this city, They would doubtless make some for you, to order, by Baron von Lenk's process.

C. R. L., of N. Y.—If you will look on another page of this journal you will see an article called "A hint worth remembering." You can draw an inference from that whether your machine is worth patenting or not.

C. E. H., of Cal.—We do not now know where you can procure a good rock-drilling machine. There are none now on sale in this market, so far as we can ascertain.

J. A. McC., of Mich.—Address Wilcox & Hall, Middletown, Conn., for galvanized castings of malleable or cast-iron.

J. R. L., of N. Y.—The safety valve was first invented by Papin in 1700, who applied it to a cooking machine for digesting bones, meats, &c.

A. S., of N. J.—Your small boiler is not safe over 25 pounds on the square inch. Slippery elm will sometimes remove scale from boilers; in others spent tan bark has been found useful. The nature of boiler scale varies with the locality; what might be a good prescription in one case would be utterly worthless in another. Pure rain water is decidedly the best if you can get it.

J. W., of Canada.—We perceive nothing new in your suggestions. Vessels with compartments, and a rudder at each end are now in use. Propellers at the sides are old. Fog signals for indicating the direction of movement for vessels are employed.

G. S. S., of Pa.—Use Hilton's Insoluble Cement for sticking your glass letters on to your windows, it is a good thing. It can be had in stores.

P. S., of Va.—You should address H. C. Baird, 406 Walnut street, Philadelphia, for a treatise on the slide rule. If he has'nt got it, he can get it, or anything else in the book line.

Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, Feb. 25, 1864, to Wednesday, March 2, 1864 :—

J. D. McL., of N. Y., $35; H. B. C., of Pa., $16; H. & S., of Pa., $50; D. G., of Pa., $30; J. S., of Conn., $31; G. C., of Mich., $25; H. L., of Ky., $44; R. E. B., of Mich., $16; J. P. A., of Wis., $16; F. M., of Mo., $25; G. & P., of Cal., $40; J. A. K., of Mo., $20; F. A. De M., of N. Y., $15; R. P. P., of N. Y., $45; J. F. C., of N. Y., $22; H. & R., of Ohio, $50; D. P., of N. Y., $16; Mrs. S. A. M., of N. Y., $16; G. R. V., of N. Y., $20; E. T. S., of N. Y., $41; A. S. S., of N. Y., $10; H. G. E., of N. Y., $25; C. B. G., of Iowa, $16; A. E. W., of Ill., $16; R. F., of Ind., $20; P. & B., of Pa., $16; S. & B., of Ind., $15; W. H. S., of Ohio, $15; T. D. H., of Conn., $16; E. M., of Mich., $19; A. J. F., of Vt., $25; B. & B., of Mass., $25; B. L., of Mich., $209; R. L. S., of Conn., $20; E. C. A., of N. Y., $22; H. W. G., of N. Y., $16; J. McL., of Ohio, $20; E. H., of N. Y., $61; J. W. P., of Mass., $20; J. G., of N. Y., $16; W. W., of N. Y., $16; P. C., of N. Y., $25; G. K. W., of Conn., $12; H. M., of Pa., $16; O. M. F., of Pa., $25; C. A. C., of Pa., $25; W. B., of Mass., $25; O. W. K., of Wis., $25; E. H. M., of Iowa. $25; A. E. K., of Pa., $16; W. C. H., of Ill., $25; W. D., of Cal., $20; P. P., of N. H., $16; K. & S., of Ill., $16; D. R. W., of Iowa, $20; L. W., of Conn., $22; J. H. T., of N. J., $16; A. M. W. of N. Y., $41; T. W., of Mass.. $41; B. M. F., of N. Y., $16; E. B., of England, $41; W. H. J., of N. Y., $28; S. & B., of N. Y., $101,

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Feb. 25, 1864, to Wednesday, March 2, 1864 :

J. D. McL., of N. Y.; H. G. E., of N. Y.; D. A. G., of N. Y.; E. C. A., of N. Y.; L. W., of Conn.; E. H., of N. Y.; A. M. W., of N. Y.; E. T. S., of N. Y.; E. B., of England; H. & S., of Pa.; O. M. F., of Pa.; W. H. F., of Pa.; D. G., of Pa.; J. B., of Ohio; C. A. C., of Pa.; R. F., of Ind.; F. M., of Mo.; J. C., of N. J.; O. W. K., of Wis.; E H. M., of Iowa; W. C. H., of Ill.; A. J. F., of Vt.; G. C., of Mich.; W. B., of Mass.; G. W. M., of Mass.; B. & B., of Mass.; G. K. W., of Conn.; P. C., of N. Y.; W. H. J., of N. Y.; A. P., of Kingdom of Hanover (2 cases); F. A. J., of Prussia.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given ; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

TWENTY-FIVE CENTS!—THE YANKEE KNIFE-Cleaner illustrated in this number of the SCIENTIFIC AMERICAN is one of the most profitable enterprises that can be embarked in. To incorporated companies making small castings it is invaluable as the sale is quick and the profit large; it weighs less than half a pound and is all cast iron except the rubber which is of wood. Sold at twenty-five cents it will prove not only popular but a speedy return for the capital interested. Samples sent by express on receipt of 25 cents. For further particulars address EGBERT P. WATSON, Box 773, New York Post Office. 1

A PATENT RIGHT FOR SALE.—McDONALD'S screw wrench, the best in the United States or elsewhere. It is a time-saving Tool. It is particularly adapted to the use of Engineers Machinists and Plumbers. It will open wider, easier and quicker than any wrench in use. Being simple in construction it is not liable to get out of order. See engraving in No. 2, Vol. 10, SCIENTIFIC AMERICAN. Persons wishing to buy the entire right or take an interest in the manufacture can apply personally or address the undersigned who will show the wrench or send descriptive circulars on application. JOHN MORRISON, Park Hotel, New York, or at Dubuque, Iowa. 1*

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$1,000.—MR. SAMUEL BARKER, OF NEW York, in his life-time, invented a compound material for tanning leather which was most superior, he left the secret of this compound to his wife alone. Call or send a stamp and get a circular that has ample and conclusive vouchers. Buy, and make your fortune. Address or apply to HARVEY BROWN, 121 Nassau street, New York, from 10 to 12. 1*

A TREATISE ON SUGAR MACHINERY—INCLUDing the process of producing sugar from the cane ; refining moist and loaf-sugar, home and colonial ; the practical mode of designing, manufacturing and erecting the machinery, &c.; with four single and 12 large folding plates. By N. P. Burgh. 1 Vol., 4to., $12.

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11 2 JOHN WILEY, 535 Broadway, New York.

IRON PLANER FOR SALE.—MANUFACTURED IN Worcester, Mass. Has been used but little. Planes 4½ feet long, 26½ inches wide, and 24 inches high. Address C. R. & J. O. TABER, Salem, Ohio. 11 4*

A FULL SET OF THE PARKER WATER WHEEL Patterns for sale. Apply to JAMES T. SUTTON & CO., Franklin Iron Works, Philadelphia, Pa. 11 2*

TUCK'S CELEBRATED PATENT ELASTIC PACKing, 109 John street, New York. H. Tomlinson, Sole Agent. Caution—All Round Rubber and Duck, or similar Packing, not stamped "Tuck's Patent" is spurious, and the sellers and purchasers are equally liable with the manufacturer therefor. 1*

THOMSON'S PATENTED IMPROVEMENTS ON THE Barometer. Rights for sale. Farmers may now be supplied with real weather-glasses for a single dollar, warranted to be as reliable as the most expensive barometers that are made. Applicants for patent rights will have their money returned, if not as here represented. Address JOHN THOMSON, Wayne, Du Page county, Ill. 1*

IMPORTANT TO CARPENTERS AND WOOD WORKers.—Talpey's Patent Self-feeding Hand-sawing Machine saves labor, timber, time, and money. This is the unanimous testimony of hundreds who are using them. Descriptive circulars sent on application to HOAG & HAMPSON, 96 Maiden Lane, New York. 11 5*

PATENT SHOVEL AND LIFTER COMBINED.—State and County Rights for sale for Davis's Patent Shovel and Lifter combined. See this paper of Nov. 21st, 1863, for cut of same. Address WM. E. DAVIS, 89 Orange street, Brooklyn, N. Y. 11 2*

TO WOOLEN MANUFACTURERS.—PARTIES WISHing a double-filling stop motion for power looms will please address C. A. OTTERSON, Clinton, Mass. 1*

SCALING OF BOILERS.—H. N. WINANS, NEW York:—Your Powder proved highly satisfactory. I think it a really good thing, and intend giving you the notice it deserves in my Journal. B. W. SEATON, Galva, Ill., Editor of the "Union."
11 2*

ANTI-INCRUSTATION.

Several of my neighbors and myself used your Powder with the best results. We shall order more soon. G. SEAMAN, Kenton, Ohio.
H. N. WINANS, New York. 11 2*

BOLT-HEADING MACHINE.—THE UNDERSIGNED wish to purchase the best bolt-heading machine in the country. Address S. & M. PENNOCK & CO., Kennett Square, Pa. 11 2*

HORSE-SHOE AND SHIPS' SPIKES MACHINES.—H. G. Hutchinson, Gananoque, Canada West, wishes to correspond with makers of Horse-shoe Machines and Machines for making Ships' Spikes. Address as above. 11 2*

WANTED HAMMERMEN AND FURNACEMEN.—Wanted two hammermen to forge heavy shafts, cranks, and other forgings, with steam hammers. Also two furnacemen to work the furnaces for heating forgings. None but good workmen need apply, as none other will be employed. The highest wages and steady employment will be given to "No. 1" mechanics. Address, enclosing references, Niles Works, Cincinnati, Ohio. 1*

DRAFTING INSTRUMENTS FOR ENGINEERS, SURveyors, Architects, Machinists, and Schools, Engineers' and Surveyors' transits, levels, compasses, and chains, Chesterman's Metallic and Steel Tape-measures, for sale, wholesale and retail, by JAMES W. QUEEN & CO., 924 Chestnut street, Philadelphia. Priced and illustrated catalogues gratis. 11 10*

TEMPLETON ON STEAM AND THE STEAM ENGINE.

THE PRACTICAL EXAMINATOR, OR STEAM AND THE STEAM ENGINE ; with Instructive References relative thereto. Arranged for the use of Engineers, Students, and others. By William Templeton, Engineer. In one vol., 12mo., price SEVENTY-FIVE CENTS. Sent free of postage to any address. This little volume, which was originally intended solely for the Author's own private use, has been pronounced by Engineers one of the most valuable books on the Steam Engine ever published. On the strength of the high commendation it has received from men competent to judge of its merits, and the large and rapidly increasing demand for it among Engineers in the Navy, and others, the publisher recommends it to the consideration of the Engineering Profession with very great confidence.

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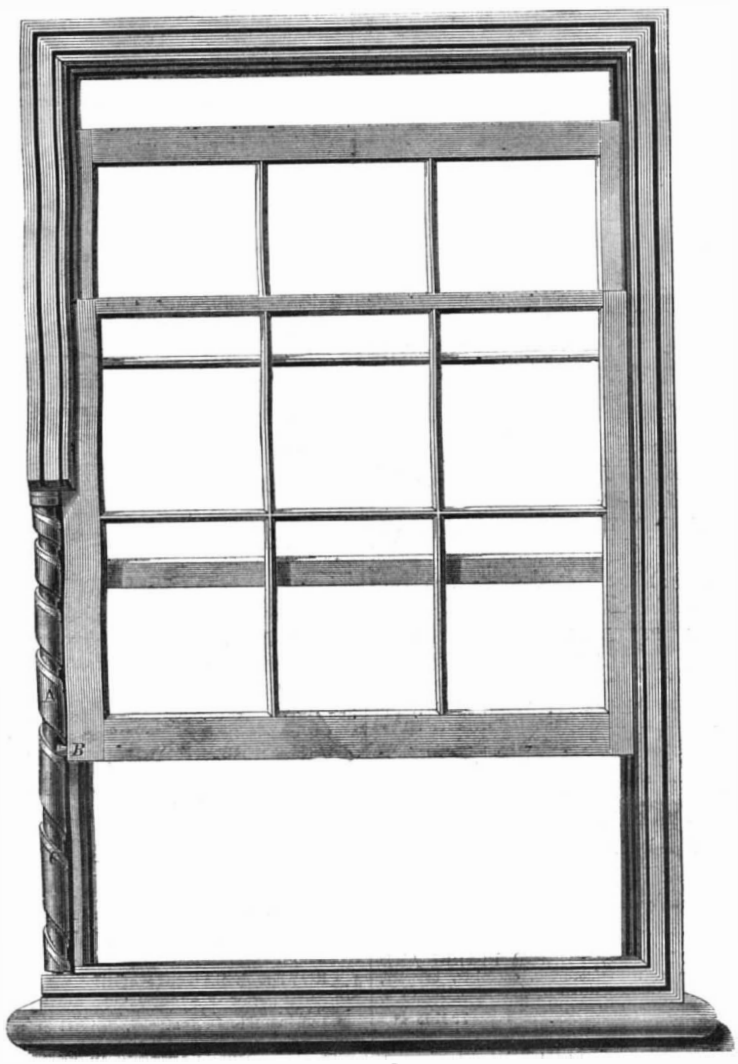
This engraving represents a very ingenious device for sustaining window sashes at any desired point. It is simple and novel in its arrangement, and will, if properly made, work well. In the engraving one side of the window jamb is broken away showing a spiral-grooved cylinder, A, and a small roller, B. These are the principal parts of the invention. The roller runs loosely on an arm let into the sash, and travels on a metallic track or guide, C. The cylinder has a bearing in metallic plates on each end, and at the bottom there is a spring fastened to the bearing in uch a manner that the revolutions of the cylinder wind it up; these are too small to be shown clear-



DAVIS'S WINDOW SASH STOP.

-y. There is also a vertical slot between the two frames of the window in which a roller attached to the sash works; so that the lateral impulse, which is given to the sash by the spiral groove in moving the sash up and down, will not tend to make it work hard or draw out of place. The operation of this device is very easily seen: when the sash is down, the spring is wound up, and the act of raising it causes the cylinder to revolve and aid the upward movement. It will be seen that the spiral on the cylinder is not of the same pitch throughout its length, but that near the top it becomes quicker; this is to compensate for the relaxed power of the spring as it becomes weaker the pitch is slower, and the cylinder revolves with more ease. When the sash is checked at any point it remains there supported by the cylinder and cannot possibly get away. There is nothing visible outwardly, the appearance of the frame being uninjured by fixtures of any kind. The invention was patented through the Scientific American Patent Agency on Oct. 6th, 1863, by John Davis, of Council Hill Station Ill.; further information can be had by addressing him at that place.

GREAT IMPROVEMENT IN ENGRAVING.

In the process of engraving metallic plates by etching with acids there has been one obstacle to perfect work which we have regarded as insurmountable. As heretofore practiced, this process consisted in covering the plate with a thin coating of wax, then scratching, through the wax, lines of the proper form to produce the desired picture, and pouring nitric acid over the plate. Wherever the plate was covered by the wax it would be protected from the action of the acid; but in the lines where the wax was scratched away, the acid would dissolve the plate, forming channels similar to those made by the burin of the engraver and with a great saving of time and labor. The principal difficulty with this process has been, that as the acid dissolved its way downward into the plate it would also work sideways under the wax, thus widening the channels as well as deepening them. It has seemed that this must necessarily always be the action of acid in etching, and that the difficulty was in the nature of things insurmountable. But this difficulty appears to have been completely overcome by a French invention which is one of the most beautiful that has ever been made in this delicate art. The inventor is Monsieur E. Vial, of Paris, and he gave a full account of his invention in a paper read before the Society of Arts, in London, on Feb. 4th, 1864.

A drawing is made with a greasy ink on a steel plate, and the plate is then plunged into a saturated solution of sulphate of copper containing 10 per cent of nitric acid. By the action of the steel the copper is reduced from the sulphate, and all portions of the steel plate not protected by the ink are instantly covered with a coating of metallic copper, which protects the steel from the action of the nitric acid. The acid soaks away the ink, and dissolves the steel, forming channels beneath the lines. But as the acid soaks away the ink it is followed by the copper solution, and a coating of metallic copper is deposited within the lines, protecting them from the further action of the acid. As the copper is deposited first at the edges of the lines, all action of the acids upon the sides of the channels is prevented, and as the acid continues its work longest towards the middle of the line, the channels are made of "V" form, which is precisely the form desired by the engraver.

In the old method it was necessary to remove the plate from the bath as soon as the finest lines were etched, and to cover these parts with wax to prevent the further action of the acid; and the plate required to be removed as many times as there were variations of shade in the engraving. But by M. Vial's process the copper is deposited first in the finest lines, while the action of the acid continues longest in those which are widest. Thus the depth of the engraving is proportioned exactly to the breadth and thickness of the ink-mark, and this by a single immersion of the plate in the bath. The process occupies but five minutes. The copper is removed by ammonia before the plate is used for printing.

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THE

Scientific American,

FOR 1864!

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